U.S. Army Center for Health Promotion and Preventive Medicine

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TRAINING MUNITIONS HEALTH RISK

ASSESSMENT

NO. 39-EJ-1485-00

RESIDENTIAL EXPOSURE FROM INHALATION OF AIR EMISSIONS FROM THE 155-MM PROPELLING

CHARGE (M3 SERIES)

DEPARTMENT OF DEFENSE IDENTIFICATION CODE: D540

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U.S. Army Center for Health Promotion and Preventive Medicine

The lineage of the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) can be traced back over 50 years. This organization began as the U.S. Army Industrial Hygiene Laboratory, established during the industrial buildup for World War II, under the direct supervision of the Army Surgeon General. Its original location was at the Johns Hopkins School of Hygiene and Public Health. Its mission was to conduct occupational health surveys and investigations within the Department of Defense's (DOD's) industrial production base. It was staffed with three personnel and had a limited annual operating budget of three thousand dollars.

Most recently, it became internationally known as the U.S. Army Environmental Hygiene Agency (AEHA). Its mission expanded to support worldwide preventive medicine programs of the Army, DOD, and other Federal agencies as directed by the Army Medical Command or the Office of The Surgeon General, through consultations, support services, investigations, on-site visits, and training.

On 1 August 1994, AEHA was redesignated the U.S. Army Center for Health Promotion and Preventive Medicine with a provisional status and a commanding general officer. On 1 October 1995, the nonprovisional status was approved with a mission of providing preventive medicine and health promotion leadership, direction, and services for America's Army.

The organization's quest has always been one of excellence and the provision of quality service. Today, its goal is to be an established world-class center of excellence for achieving and maintaining a fit, healthy, and ready force. To achieve that end, the CHPPM holds firmly to its values which are steeped in rich military heritage:

- **★** Integrity is the foundation
 - ★ Excellence is the standard
 - * Customer satisfaction is the focus
 - ★ Its people are the most valued resource
 - ★ Continuous quality improvement is the pathway

This organization stands on the threshold of even greater challenges and responsibilities. It has been reorganized and reengineered to support the Army of the future. The CHPPM now has three direct support activities located in Fort Meade, Maryland; Fort McPherson, Georgia; and Fitzsimons Army Medical Center, Aurora, Colorado; to provide responsive regional health promotion and preventive medicine support across the U.S. There are also two CHPPM overseas commands in Landstuhl, Germany and Camp Zama, Japan who contribute to the success of CHPPM's increasing global mission. As CHPPM moves into the 21st Century, new programs relating to fitness, health promotion, wellness, and disease surveillance are being added. As always, CHPPM stands firm in its commitment to Army readiness. It is an organization proud of its fine history, yet equally excited about its challenging future.

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TRAINING MUNITIONS HEALTH RISK ASSESSMENT NO. 39-EJ-1485-00 RESIDENTIAL EXPOSURE FROM INHALATION OF AIR EMISSIONS

EXECUTIVE SUMMARY

FROM THE 155-MM PROPELLING CHARGE, M3 SERIES

This assessment evaluated the potential for human health effects to offsite residents breathing the air emissions from the 155-mm propelling charge used during training exercises. Propelling charges are used in weapons to provide the force needed to send a projectile to its target. This assessment looked at five different combinations in which the 155-mm propelling charge is used. This involved looking at the two 155-mm propelling charges, M3 and M3A1, fired from the M199 and M284 howitzer cannons, and for two different charge zones.

To conduct this assessment, air emissions from the 155-mm propelling charge were collected in a test chamber located at the U.S. Army Aberdeen Test Center, Aberdeen Proving Ground, Maryland. The data collected from the Firing Point Emission Study provided the amount and types of substances released from the 155-mm propelling charge. This information was then used in an air dispersion model to determine ambient air concentrations at locations downwind from the 155-mm propelling charge firing location. Since the training facility in this assessment is hypothetical, the air model used assumptions that provided conservative estimates of air concentrations.

Modeled air concentrations were combined with exposure information (e.g., number of exposures per year) to estimate the amount of each substance the hypothetical resident breathes. This estimate was combined with a substance's health information, which was obtained from agencies such as the U.S. Environmental Protection Agency, to determine if there is a potential for health risks from inhalation.

The health risk assessment included both long-term (30 years) and short-term (15 minutes or 1-hour) exposures to modeled substance concentrations. Assessment results, generated using conservative methods, showed that the hypothetical offsite resident breathing air as close as 200 meters (656 feet) from the M3 and M3A1 firing locations is safe from these emissions. It should be noted that at most training facilities, training areas are at least 1,000 meters (over half a mile) away from populated areas.

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LIST OF ACRONYMS

AEGL Acute Exposure Guideline Levels

AIHA American Industrial Hygiene Association

Cr Chromium

DODIC Department of Defense Identification Code

DOE U.S. Department of Energy

EPA U.S. Environmental Protection Agency

ERPG Emergency Response Planning Guidelines

HBSL Health-Based Screening Level

HCl Hydrochloric Acid (or Hydrogen Chloride)

INPUFF Integrated Puff Model

mg Milligram
mm Millimeter

NAAQS National Ambient Air Quality Standards

NAC/AEGL National Advisory Committee for Acute Exposure Guideline Levels

NEW Net Explosive Weight

NH₃ Ammonia

OEL Occupational Exposure Limit

PM₁₀ Particulate Matter Under 10 Microns in Size

PRG Preliminary Remediation Goals

RBC Risk-Based Concentration

RfC Reference Concentration

TEEL Temporary Emergency Exposure Limits

TPCWG Total Petroleum Criteria Working Group

TSP Total Suspended Particulates

USAATC U.S. Army Aberdeen Test Center

USACHPPM U.S. Army Center for Health Promotion and Preventive Medicine

USAEC U.S. Army Environmental Center

TRAINING MUNITIONS HEALTH RISK ASSESSMENT NO. 39-EJ-1485-00 RESIDENTIAL EXPOSURE FROM INHALATION OF AIR EMISSIONS FROM THE 155-MM PROPELLING CHARGE (M3 SERIES)

PURPOSE

This document presents the assessment of the potential for human health effects to offsite residents who may be exposed to air emissions following the use of the 155-mm propelling charges, M3 and M3A1.

2. AUTHORITY

Memorandum, U.S. Army Environmental Center, 4 June 1999, Subject: Pyrotechnics Risk Assessment.

3. REFERENCES

See Appendix A for a list of references.

4. BACKGROUND

4.1 WHAT ARE PROPELLING CHARGES?

Propelling charges (or propellants) are a type of explosive used in weapons to send a projectile to the target. When ignited, the propelling charge causes the pressure inside the weapon to build up quickly. This pressure eventually reaches a maximum and pushes the projectile out of the barrel to the target. Some examples of projectiles include rockets, bullets, and missiles.

The amount of propelling charge used varies with the type of weapon. In smaller arms (typically any gun below a 20-mm bore size), the propelling charge is fixed. In larger weapons such as artillery ammunition, the propelling charge may be adjustable. These kinds of ammunition are also called semi-fixed ammunition. For semi-fixed ammunition, the propellant is divided into different charges. The amount of propellant used in semi-fixed ammunition depends on various factors such as distance to the target.

Propelling charges are also used to send fireworks into the sky or in flares to send the signal into the air. The major difference between these various devices is the composition of the propellant and the amount of propellant used.

4.2 WHAT IS THE 155-MM PROPELLING CHARGE?

The 155-mm propelling charge is used for firing projectiles from 155-mm howitzers (a kind of cannon). It is a semi-fixed ammunition propellant that is issued in five bags of different charges. Each bag is also called an increment and contains a premeasured amount of propellant. The bags are fastened together with cloth straps

sewn to the base of each increment and tied on the top of the fifth increment (Reference 1). The 155-mm propelling charge can be classified into two types: M3A1 and M3 (M3 series). They are also commonly called "green bags" because the charges are loaded in green cloth bags.

The M3 series contain about 5.5 pounds of propellant. Charge M3A1 also includes flash reducer pads that contain either potassium nitrate or potassium sulfate. As the name suggests, the reducer pads are used to limit breech flareback, muzzle flash, and blast overpressure in the weapon. Both the M3A1 and the M3 charges are issued with an igniter charge that is made up mostly of nitrocellulose or black powder, respectively. Both nitrocellulose and black powder are commonly used in consumer fireworks.

4.3 USES OF THE 155-MM PROPELLING CHARGE

Up to five charges can be loaded into the howitzer before a projectile can be fired. The base charge is always used and subsequent increments are loaded depending on the type of projectile or cannon used, or the distance to the target. The amount of propellant used defines a particular charge zone. For example, charge zone 3 means that the base charge and charge increments 2 and 3 are used. The range of each charge zone will vary for different weapon and projectile types.

It is very important for our troops to learn and understand the proper use of the different types of propellants and projectiles. Only through training can they learn to safely and efficiently use these devices to prepare them for combat situations.

4.4 ASSESSMENT SUMMARY

The general assessment approach consisted of two main parts: air dispersion modeling and exposure assessment. These are briefly discussed in the paragraphs below. Sections 5 through 7 present a discussion of the methodology used for this assessment.

Emissions data used in the air dispersion modeling was obtained from the Firing Point Emission Study, conducted by the U.S. Army Aberdeen Test Center (USAATC), at Aberdeen Proving Ground, Maryland (References 2, 3). This study was funded by the U.S. Army Environmental Center (USAEC) with the purpose of identifying and quantifying emissions from weapons firing. Data from this study was generated by firing munitions with weapons that are representative of those used by the U.S. Army during training operations.

The emissions data for the 155-mm propelling charge was used with an atmospheric dispersion model to estimate the average concentrations that may be experienced by an offsite resident. Since this assessment is designed to provide results that would be applicable to most Army training facilities, the training area used in this assessment was a hypothetical one. While most training areas are at least 1,000 meters away from populated areas, as a conservative distance, it was initially assumed

that a person could reside 100 meters downwind from the firing point (location where the cannon is positioned). In addition, air-modeling parameters were selected to mimic worst-case conditions.

The exposure assessment included calculations of time-averaged concentrations for both long-term (chronic) and short-term (acute) exposures. For the purpose of this assessment, air concentrations were averaged over 30 years for chronic exposures and 1-hour or 15 minutes for acute exposures. Using a screening approach, a substance's estimated time-averaged air concentration was then compared to chronic health-based screening levels (HBSLs) established by the U.S. Environmental Protection Agency (EPA) or acute toxicity values (ATVs) established by selected agencies depending on the exposure duration (i.e., 30 years versus 1-hour or 15 minutes). The comparison was made using the ratio of the HBSL or ATV to the estimated air concentration for each of the substances evaluated. If this ratio was less than one, no further evaluation was needed. This approach is conservative because the exposure assumptions used by the agencies, to establish HBSLs and ATVs, are likely to overestimate the exposures experienced by offsite residents living near firing ranges. If the chronic or acute averaged concentrations (Cchronic and Cacute) were greater than the screening levels, producing a ratio greater than one, further evaluation would be warranted to determine the potential for health effects. Note that concentrations greater than the screening levels do not indicate an onset of health effects, but rather, the potential for such.

5. DATA COLLECTION AND AIR MODELING

5.1 EMISSION FACTORS

Emission factors, used to derive the air modeling emission rates used in this assessment, were generated from the Firing Point Emission Study conducted by USAATC. This study identified and quantified air emissions from the firing of training munitions. The data included the net explosive weight (NEW), the substances sampled, and substance-specific emission factors. The 155-mm propelling charge is the first in this series of testing that fall under the Firing Point Emission Study.

Tests for the 155-mm propelling charge were conducted using conditions that would typically be encountered during short-range training or test exercises. Both the M3A1 and the M3 charges were tested using different cannons. Table 1 summarizes the test conditions in which these charges were fired. The resulting emissions data from these tests are included in the first four columns of the air dispersion modeling output data in Appendix B.

TABLE 1: TEST CONDITIONS FOR THE 155-MM PROPELLING CHARGES

Test Munition	Weapon	Projectile	Charge Zone
	M199 howitzer cannon	Inert M107 HE ¹	3
Charge M3	M199 howitzer cannon	Inert M107 HE	5
	M248 howitzer cannon	Inert M109 HE	3
Charge M3A1	M199 howitzer cannon	Inert M109 HE	3
	M248 howitzer cannon	Inert M109 HE	3
'HE = high explosive Source: Reference 2			

5.2 BACKGROUND AND DESCRIPTION

Air dispersion models are available to mathematically simulate plume behavior and to estimate downwind concentrations of substances emitted from various sources. However, specific models are not available to determine the dispersion of emissions from munitions used during training. Estimating the magnitude and location of these concentrations depends on many factors including the amount and type of emissions, the behavior of the source, and meteorological conditions. Since a specific model is not available for modeling the use of munitions during training, the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) evaluated numerous air models to determine which would be suitable for use with munitions used during training. The USACHPPM recommended using the Integrated PUFF (INPUFF) model to estimate the dispersion of emissions from various sources (Reference 4).

The INPUFF Model (Reference 5) was developed to simulate dispersion from instantaneous or semi-continuous point sources. This Gaussian-integrated puff model is capable of addressing a cloud type release over short periods of time, and computations can be performed for a single point source for multiple receptors. The algorithms used to calculate concentrations assume a vertically uniform wind direction (with no chemical reaction) to compute the contribution of each cloud at a receptor for each time step/interval.

5.3 MODEL ASSUMPTIONS

Some assumptions were made to best represent the firing of 155-mm rounds with the M3 and M3A1 propellant charges. These assumptions were as follows:

Typically, with conventional point sources (such as incinerators), the cloud rise and formation are determined by characterizing flue gas exit velocity, temperature, and stack diameter. However, the M3 and M3A1 propellants are used in conjunction with cannon systems of various lengths and diameters. For unconventional sources with no real physical stack dimensions, such as the 155-mm howitzer cannons, the stack height and

diameter were assumed to equal to the height of the barrel and the bore diameter. No exit velocity was used with these sources because the emission rates generated from the test data were obtained from sampling a stabilized cloud with no exit velocity. Table 2 includes the source parameters used to model the M3 and M3A1 propellant charges.

TABLE 2: SOURCE PARAMETERS

Parameter	Model Input
Source/Stack Diameter	0.155 meters
Source/Stack Height	1.52 meters
Source Exit Temperature	Varied per propellant combination tested
Exit Velocity	0 meters/second
Initial horizontal dispersion coefficient (σ_y)	Varied per propellant combination
Initial vertical dispersion coefficient (σ_z)	Varied per propellant combination

The two cannons used for this study were the M199 and M284 howitzers. Initial cloud dimensions are preferred to model the air emissions from these types of releases. Since this information was not measured during the studies conducted at the USAATC, visual estimates of each cloud's two-dimensional length and height were made using video footage for each test condition. The video footage showed three distinct exhaust clouds that were produced from the firings. Both cannons are equipped with muzzle brakes that divert exhaust gases and pressures 90 degrees to the left and right and to the center (front) of the muzzle. All three clouds were combined to form a single worst-case cloud with an effective volume (V_e) and effective radius (r_e). The initial horizontal and vertical dispersion values (σ_y and σ_z) of the single worst-case cloud were determined from the height and length of the single worst-case cloud. Temperature and pressure data were also recorded during testing. An average cloud temperature was calculated based on the temperatures recorded for each cloud produced during a firing scenario.

The volume of each cloud was calculated using Equation 1 and a sample calculation is provided in Example 1.

 $V = \pi r^2 h$

Equation 1

Where:

 $V = \text{Volume (ft}^3)$ r = radius; one half the height of the cloud (ft)h = length of the cloud (ft)

Example 1 Sample Calculation Using Equation 1:

$$V_{left} = \pi (1.5)^2 (15) = 106.02 \text{ ft}^3$$

Calculation provided for clouds produced from the M3 propellant, Zone 3, using the M199 cannon. Based on visual estimates, the three clouds produced by this test condition were nearly equal in height and length.

The cumulative/effective volume of each cloud was calculated using Equation 2. Example 2 provides an sample calculation using Equation 2.

$$V_e = V_{left cloud} + V_{right cloud} + V_{center cloud}$$

Equation 2

Where:

 $V_{\rm e}$ = the effective volume of a single worst- case cloud (ft³)

Note: The volumes of the left, right and center clouds were based on two-dimensional measurements of height and length. The clouds were assumed to grow equally in all directions.

Example 2 Sample Calculation Using Equation 2:

$$V_e = 106.02 + 106.02 + 106.02 = 318.06 \text{ ft}^3$$

Calculation provided for clouds produced from the M3 propellant, Zone 3, using the M199 cannon. Based on visual estimates, the three clouds produced by this test condition were nearly equal in height and length.

The effective radius (r_e) of the worst- case cloud was calculated using Equation 3. A sample calculation is provided in Example 3 below.

$$r_e = \sqrt{\frac{v_e}{\pi h}}$$
 Equation 3

Where:

 V_e = the effective volume of a single worst- case cloud (ft³) r_e = the effective radius of a single worst- case cloud (ft)

Note: Assuming a cylindrical cloud with the prevailing wind direction being perpendicular to the cannon muzzle when fired, r_e is equal to the initial vertical dispersion, σ_z and the initial horizontal dispersion, σ_v is equal to one half the length of the worst- case cloud.

Example 3 Sample Calculation Using Equation 3:

$$r_{\rm e} = \sqrt{\frac{318.06}{\pi(15)}} = 2.60 \, {\rm ft}$$

Calculation provided for clouds produced from the M3 propellant, Zone 3, using the M199 cannon.

- ➤ For this assessment, a hypothetical offsite resident was assumed to be located first at 100 meters, then at 200 meters directly downwind from the source. The meander of the cloud is a major factor when estimating concentrations at given locations downwind from the source. Assuming that the resident is directly downwind from the source is the same as assuming that there is no cloud meander and that the center of the cloud migrates directly over the hypothetical offsite resident. This assumption provides the most conservative modeled concentrations.
- Since this assessment does not look at a specific training site, generic, worst-case meteorological data were used. To determine the worst-case meteorological conditions that would result in the highest air emission concentrations, the modeling was performed using the EPA Risk Management Program Guidance (Reference 6). This guidance includes tables for estimating the footprint of chemical releases, and is intended to inform emergency responders of potential accidental releases. The EPA has

defined most default conditions for meteorological modeling parameters. Table 3 lists the meteorological parameters that were used in the air model.

TABLE 3: WORST-CASE METEOROLOGICAL PARAMETERS

Parameter	Model Input
Wind Speed	1 meter/second
Atmospheric Stability	Category F
Wind Direction	270°
Ambient Temperature	293 degrees Kelvin (°K) (or 68 °F)

5.4 GENERAL METHODOLOGY

The model was run for a total calculation time of 200 seconds for the 100-meter location and 400 seconds for the 200-meter location. This was done to simulate a single round being fired and to ensure that the total mass of the cloud had passed the receptor locations. Concentrations were calculated every 2 or 4 seconds, depending on the location being modeled. Table 4 contains the air model input parameters used in this assessment.

TABLE 4: AIR MODEL INPUT PARAMETERS

Parameter	Mode	Input
	100 meters	200 meters
Number of meteorological periods (NTIME)		1
Duration of each meteorological period (ITIME)	200 seconds	400 seconds
Number of updates to the source (NSRCDS)		00
Duration/time step between each source update (ISUPDT)	2 seconds	/4 seconds
Total time modeled/Simulation Period (NTIME) (ITIME)= (NSRCDS) (ISUPDT)	200 seconds	400 seconds

5.5 USE OF MODEL OUTPUT

The concentrations provided by the INPUFF model were based on a unit emission rate of 1 gram/second from an emission source, and did not represent any substance-specific concentrations from the use of any weapons system. This unit emission rate is typically used for ease of modeling purposes. The relationship between the emission rate and predicted concentration is linear. Therefore, the ratio of the predicted concentration to the unit emission rate was multiplied by each substance-specific emission rate to provide substance-specific concentrations.

5.6 DETERMINATION OF SUBSTANCE-SPECIFIC EMISSION RATES

The actual emission rate for one item (ER₁) for each substance was calculated using Equation 4. Example 4 contains a sample calculation using this equation.

$$ER_1 = \frac{EF \cdot CV}{t}$$
 Equation 4

Where:

ER₁ = emission rate for one item (g/sec)

EF = average adjusted emission factor (lb/item)

CV = conversion factor (453.59 g/lb)

t = release duration obtained from the INPUFF model (sec)

Example 4 Sample Calculation Using Equation 4:

$$ER_1 = \frac{(4.120 E - 02) (453.59)}{(4)} \times 1 \text{ item}$$

= 4.672 E+00 g/sec

Calculation provided for ammonia (NH₃) from data for the M3, Zone 3, M199 cannon, 200 meters downwind from the firing point. Appendix B contains the average adjusted emission factor of NH₃ in lb/item.

Substance-specific ambient concentrations for one item (CONC) were calculated using Equation 5. A sample calculation is provided in Example 5.

$$CONC = ER_1 \cdot \frac{UC}{ER_{unit}}$$
 Equation 5

Where:

CONC = substance concentration based on one item (g/m³)

 ER_1 = emission rate for one item (g/sec)

 ER_{unit} = unit emission rate as used in the model (g/sec)

UC = concentration based on the unit emission rate (g/m³)

Example 5 Sample Calculation Using Equation 5:

$$CONC = (4.672E + 00) \frac{(6.914E - 05)}{(1)}$$

 $= 3.230E-04 g/m^3$

Calculation provided for NH₃, for the propelling charge M3, Zone 3, M199 cannon, 200 meters downwind from the firing point.

6. RISK ASSESSMENT

6.1 EXPOSURE ASSUMPTIONS

Exposure assumptions were selected using a typical use scenario for the 155-mm propelling charge. This use scenario was provided by the USAEC and is based on consultation with their senior training advisor (References 7). The frequency of use of the propelling charge was required to determine how much substance an offsite resident would be exposed to in the time period of interest (i.e., acute or chronic exposure). Table 5 summarizes the general use scenario for the 155-mm propelling charge.

TABLE 5: FREQUENCY OF USE FOR THE 155-MM PROPELLING CHARGE

	MINIT ROLLERIO CHANGE
Parameter	General Training Scenario
Number of items used per training scenario	98 items over 6 weeks
Number of training scenarios per year at a specific training location	2
Time between events	Week 1 – 30 per 24 hour period Week 3 – 34 per 24 hour period Week 5 – 34 per 24 hour period
Maximum number of items that could potentially be used in one hour	26

6.2 TIME-AVERAGING

For the chronic assessment, time-averaged concentrations were calculated by assuming that the hypothetical resident would be exposed for 30 years. This is consistent with the exposure duration used by the EPA, which assumes that the resident spends 30 years at the same residence. By using the same exposure duration, the estimated time-averaged concentrations could be compared with their respective HBSLs, which are derived using standard EPA default assumptions.

As shown in Table 5, training in which the 155-mm propelling charge is used occurs over two 6-week periods (Reference 6). In addition, based on the information

provided, actual training takes place three times during this 6-week period. Therefore, for this assessment, the total number of days that a nearby resident was exposed to the air emissions from the 155-mm propelling charge is 6 days a year (3 days per training scenario x 2 trainings scenarios per year).

Another parameter that is needed for the exposure assessment is the duration of each exposure. This parameter depends on various factors such as wind velocity and therefore, cannot be accurately predicted. However, to be consistent with the assumptions used in the air model, the simulation period (see Table 4) for each round was used in the exposure assessment. This simulation period is the same for the five different test conditions.

The average daily concentrations were calculated using Equation 6. A sample calculation using NH₃ is shown in Example 6.

$$C_d = \frac{CONC \cdot 10^6 \cdot ET_{round} \cdot EF_{day}}{1440}$$
 Equation 6

Where:

 C_d = the average daily concentration (μ g/m³) CONC = average modeled concentration (g/m³)

10⁶ = units conversion (μ g/g)

 ET_{round} = exposure time (minutes/round)

 EF_{day} = number of events per day (rounds/day)

= unit conversion (minutes/day)

Example 6 Sample Calculation Using Equation 6:

$$C_{d(NH_3)} = \frac{(3.231E - 04)(10^6)(6.67)(34)}{1440}$$
$$= 5.088E + 01 \,\mu\text{g/m}^3$$

Example is provided for charge M3 (zone 3), using the M199 cannon. Averaged modeled concentration of NH_3 is for a distance of 200 meters downwind from the firing point. Table 6 summarizes the exposure parameters.

Chronic averaged concentrations were calculated using Equation 7. The resulting concentration (C_d) from Equation 6 was used in Equation 7 to determine the averaged chronic concentrations. Example 7 shows how this calculation was performed.

$$C_{chronic} = \frac{C_d \cdot EF_{years} \cdot ED}{AT}$$
 Equation 7

Where:

 $C_{chronic}$ = average chronic concentration ($\mu g/m^3$) C_d = average daily concentration ($\mu g/m^3$)

 EF_{years} = number of days per year (days/year)

ED = exposure duration (year)
AT = averaging time (days)

(for carcinogenic endpoint, AT = 70 years x 365 days per year; noncarcinogenic endpoint, AT = ED x 365 days per year)

Example 7 Sample Calculation Using Equation 7:

$$C_{chronic(NH_3)} = \frac{(5.088 \,\mathrm{E} + 01)(6)(30)}{(30)(365)}$$
$$= 8.36 \,\mathrm{E} - 01 \,\mathrm{\mu g/m^3}$$

Averaged daily concentration was calculated as shown in Example 6. Table 6 summarizes the exposure parameters.

This assessment assumed that the same person would be exposed 6 days every year for 30 years. As shown from Table 5, the use of the 98 items is spread out unevenly over a 6-week period. Therefore, to provide conservative estimates for this assessment, it was assumed that 34 rounds (as opposed to 30 rounds) were activated during each day of training. This results in a total of 104 items used over a 6-week period as opposed to the 98 items listed in Table 5. Table 6 summarizes the exposure parameters used in Equations 6 and 7.

TABLE 6: EXPOSURE PARAMETERS USED TO DETERMINE TIME-AVERAGED CHRONIC AIR CONCENTRATIONS

Exposure Parameter	Value Used
Exposure Time (ET _{round})	
At 100 meters	3.60 minutes/round
At 200 meters	6.67 minutes/round
Exposure Frequency (EF _{day})	34 rounds/day
Exposure Frequency (EF _{year})	6 days/year
Exposure duration (ED), years	30 years

Unlike the chronic assessment, only limited guidance for evaluating acute exposures is currently available. For the purpose of this assessment, acute is defined as a 1-hour or a 15-minute exposure. The 1-hour or 15-minute acute exposure averaging times allow for comparison with guidelines developed specifically for emergency planning purposes (see discussion on acute toxicity below).

The USAEC senior training advisor conservatively estimated that as many as 26 rounds could be fired in 1 hour. Based on the lack of information to better quantify acute exposures, this assessment assumed that 26 rounds are used in one hour. Average acute concentrations were computed using Equation 8 followed by a sample calculation in Example 8. If a substance has an acute toxicity that is based on a 15-minute exposure, Equation 8 was adjusted by a factor of 1/0.25 (where 0.25 is 15 minutes expressed in hours).

$$C_{acute} = \frac{CONC \cdot 10^6 \cdot ET_{round} \cdot EF_{hour}}{60}$$
 Equation 8

Where:

 C_{acute} = average acute concentration ($\mu g/m^3$) CONC = average modeled concentration (g/m^3)

10⁶ = unit conversion (μ g/g)

ET_{round} = exposure time (minutes/round) EF_{hour} = exposure frequency (rounds/hour) 60 = units conversion, (minutes/hour)

Example 8 Sample Calculation Using Equation 8:

$$C_{acute(NH_3)} = \frac{(3.231E - 04)(10^6)(6.67)(26)}{60}$$
$$= 9.33E + 02 \mu g/m^3$$

Example is provided for charge M3 (zone 3), using the M199 cannon. Averaged modeled concentration of NH_3 is for a distance of 200 meters downwind from the point source. Since the acute toxicity value for NH_3 is based on a 1-hour exposure, no further adjustment in the acute concentration was necessary.

6.3 TOXICITY ASSESSMENT

The potential for health risks was determined by comparing time-averaged air concentrations to health-based screening levels, which are developed from a substance's known toxicity. These toxicity values typically include different levels of safety factors depending on the level of confidence of the critical study. Appendix C contains a table of screening toxicity values for the chronic and the acute assessments.

6.3.1 CHRONIC ASSESSMENT

The chronic assessment was conducted using a screening approach. Using this method, a substance's estimated time-averaged concentration was compared to its HBSL by using the ratio of the HBSL to the estimated concentration. If this ratio was less than one, no further analysis was necessary. This approach is conservative because the exposure assumptions used by the EPA, to develop HBSLs, assume that the resident is exposed for 350 days per year (this assumes 2 weeks of vacation per year). In contrast, exposure to air emissions from actual training with the 155-mm propelling charge is intermittent and not likely to occur on a daily basis year round.

A hierarchy of sources was developed for selection of the HBSLs to quantitatively evaluate as many of the identified substances as possible. The hierarchy of sources used was as follows:

- Clean Air Act, EPA National Ambient Air Quality Standards (NAAQS) (Reference 11)
- > EPA Region 9 Preliminary Remediation Goals (PRGs) (Reference 9)
- ➤ EPA Region 3 Risk-Based Concentrations (RBCs) (Reference 8)

Some substances have neither PRGs nor RBCs because they have their own set of regulatory standards. Under the Clean Air Act, the EPA is required to establish NAAQS for several substances considered harmful to public health and the

environment. Currently, NAAQS are available for seven substances. The NAAQS for the longer averaging time were used for the chronic assessment. Depending on the substance, this can range from an 8-hour average to an annual average. In addition, since the majority of the measured total suspended particulates (TSP) were PM_{10} (particulate matter under 10 microns in size) (Reference 3), the NAAQS for PM_{10} was used to evaluate the potential for health effects from exposure to TSP.

Next on the hierarchy, after the NAAQS, are the EPA Region 9 PRGs and the EPA Region 3 RBCs. Since the methodology used by EPA Region 9 to develop the PRGs generally results in lower values than the EPA Region 3 RBCs, the PRGS were first on the hierarchy of sources. RBCs were used when a PRG was not available. The only exception was for chromium (VI) [Cr (VI)] where Region 9 used a carcinogenic toxicity value that was seven times greater than EPA's recommended value (Reference 10) to develop its screening level for inhalation exposure. Since the EPA does not advocate the application of this multiplication factor, the RBC for Cr (VI) was used instead of the PRG. To ensure that the most recent information was used, the Internet sites of both EPA Regions were checked. The HBSLs used for this assessment are presented in Appendix C.

Although the general approach used by both EPA Region 3 and Region 9 is the same, the exposure assumptions differ enough so that final recommended values can vary to a certain degree. In both methods, a substance's screening concentration was selected using the toxicity endpoint that derives a lower concentration. For example, if a substance has a known systemic toxicity and is a carcinogen, the screening concentration was calculated using both toxicity values. To maintain a conservative approach, EPA then selected the lower screening concentration as the recommended PRG or RBC.

Example 9 shows a sample calculation of how a substance's estimated chronic concentration is compared to its HBSL.

Example 9

Sample Calculation Comparing a Substance's Estimated Chronic Concentration to Its Health-Based Screening Level:

$$\frac{C_{chronic(NH_3)}}{HBSL} = \frac{8.36E - 01}{1.04E + 02}$$
$$= 8.02E-03 \text{ (or } 0.008) < 1$$

Note that HBSL for NH_3 is based on Region 9's PRG. In this case, the resulting ratio is three orders of magnitude less than one.

Many petroleum hydrocarbons were detected but do not have specific screening levels. Therefore, the approach recommended by the Total Petroleum Criteria Working Group (Reference 12) was adopted to evaluate petroleum hydrocarbon mixtures. Based on the working group's assessment of various hydrocarbons, they recommended that mixtures be separated according to a substance's number of carbons and its chemical class (i.e., aliphatic or aromatic¹). Generally, as a substance's carbon number increases, its molecular weight increases and it is, therefore, not a substance of concern via inhalation. The working group has also concluded that aromatic hydrocarbons tend to be more toxic than aliphatic hydrocarbons (Reference 12). Table 7 tabulates the inhalation toxicity values used to evaluate exposure to petroleum mixtures. To be consistent with the methodology used in this assessment, the reference concentrations (RfCs) were converted to PRGs using Region 9 exposure assumptions. The resulting PRGs were used as the HBSLs for the petroleum hydrocarbons in this assessment. These values are presented in Appendix D.

TABLE 7: SUMMARY OF RfCs USED FOR PETROLEUM HYDROCARBONS1

Carbon Range	Aromatic Inhalation RfC (mg/m³)	Aliphatic Inhalation RfC (mg/m³)
$C_5 - C_6$ $C_{>6} - C_8$		18.4
C>7 - C8	0.4	And the Company of the Company
$C_{>8} - C_{10} \ C_{>10} - C_{12} \ C_{>12} - C_{16}$	0.2	1.0
$C_{>16} - C_{21}$ $C_{>21} - C_{35}$	NA	NA

NA = not applicable for high molecular weight TPHs (C_{>16}) because compounds in this carbon range are not volatile and therefore, inhalation is not a pathway of concern.

¹ Reference 12

6.3.2 ACUTE ASSESSMENT

An established method for assessing acute health effects is not currently available. In 1995 the EPA recognized the need for acute exposure guidelines for emergency response purposes and created the National Advisory Committee for Acute Exposure Guideline Levels (AEGLs) for Hazardous Substances. Currently, AEGLs are only available for only a few substances.

To overcome the absence of acute toxicity data, several state regulatory agencies have suggested that guidelines developed for emergency purposes be used in the interim. Although there have been suggestions to use occupational exposure limits

¹ Aliphatic hydrocarbons are hydrocarbons in which the carbon atoms are joined by single covalent bonds consisting of two shared electrons (e.g., butane). Aromatic hydrocarbons have ring structures (e.g., benzene). Source: Reference 13

(OELs) by applying additional safety factors (References 14, 15), OELs were not used in this assessment because they introduce even more uncertainty than the use of emergency guidelines. The OELs are designed to protect the workplace environment and assume 8 hours a day, 5 days a week exposures. By definition, these exposures are more chronic than acute.

In comparison, emergency planning guidelines are more appropriate because they are typically developed for exposures of 1-hour or less. In addition, safety factors are included as part of the guideline development, so that the values are protective of the general population.

Emergency Response Planning Guidelines (ERPG) published by the American Industrial Hygiene Association (AIHA) (Reference 16) and the Temporary Emergency Exposure Limits (TEELs) developed by the Department of Energy (DOE) (Reference 17) were also used for this assessment, specifically the ERPG-1s and the TEEL-1s. Since TEEL-1s are intended for exposures up to 15-minutes, air concentrations compared to TEELs were averaged over a 15-minute period. Air concentrations compared to the ERPGs and AEGLs were averaged over 1-hour, as these values are intended for 1-hour exposures.

For this study, the hierarchy of sources for ATV selection was as follows with each ATV defined below:

- ➤ EPA AEGL-1. "AEGL-1 is the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic, nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure."
- ➤ AIHA ERPG-1. "The maximum concentration in air below which it is believed nearly all individuals could be exposed for up to one hour without experiencing other than mild transient adverse health effects or perceiving a clearly defined objectionable odor."
- ➤ DOE TEEL-1. "The maximum concentration in air below which it is believed nearly all individuals could be exposed without experiencing other than mild transient adverse health effects or perceiving a clearly defined objectionable odor."

AEGLs were used first when available since they are developed specifically for the purpose of acute exposure assessments. The ERPGs were selected next, prior to a substance's TEEL, because they are vigorously reviewed before they are published whereas the TEELs are not.

Example 10 shows a sample calculation of how a substance's estimated acute concentration was compared to its acute toxicity value.

Example 10

Sample Calculation Comparing a Substance's Estimated Acute Concentration to Its Acute Toxicity Value:

$$\frac{C_{acute(NH_3)}}{ATV} = \frac{9.33E + 02}{1.75E + 04}$$
$$= 5.33E-02 \text{ (or } 0.05) < 1$$

Note that ATV in this example is based on NH₃'s ERPG-1. In this case, the resulting ratio is less than one, indicating that further analysis is not necessary.

7. RISK CHARACTERIZATION

As previously described, the exposure assessment included calculations of time-averaged concentrations for both long-term (chronic) and short-term (acute) exposures. Using a screening approach, a substance's estimated time-averaged air concentration was then compared to chronic HBSLs or ATVs. The comparison was made using the ratio of the HBSL or ATV to the estimated concentration. This approach is conservative because the exposure assumptions used by the EPA, to establish HBSLs and ATVs, are likely to overestimate the exposures experienced by offsite residents living near training areas.

If this ratio was less than one, no further evaluation was needed. If the chronic or acute averaged concentrations (C_{chronic} and C_{acute}) were greater than the screening levels, resulting in a ratio greater than one, further evaluation would be warranted to determine the potential for health effects. Note that concentrations greater than the screening levels do not indicate an onset of health effects, but rather, the potential for such.

The chronic and acute assessments were conducted as outlined in Section 6.3. Appendix D presents results for the five different test conditions. Results are provided for air concentrations estimated for both 100 meters and 200 meters downwind from the firing location.

7.1 CHRONIC HEALTH RISK

The chronic assessment, at the 100-meters downwind hypothetical resident location, indicated that two of the five test conditions had estimated chromium concentrations that were greater than the HBSL. The ratios of all other substances for these two conditions, except for carbon monoxide, were all well below one. Since the 100 meters location was used as an initial evaluation, the air model was remodeled to a distance 200 meters downwind from the firing point location. The results showed that the estimated air concentrations of chromium for the two test conditions indicated above

decreased to levels below chromium's HBSL. In addition, the estimated air concentrations of all other substances were also significantly reduced. All ratios for the other three test conditions were below one. Therefore, no further analysis was conducted.

Both test conditions, resulting in estimated chromium concentrations greater than the HBSL, involved the use of charge M3, fired from the M199 cannon, and for both zones 3 and 5. The ratios of the estimated chromium concentrations to the HBSL were 2.5 and 2.1, respectively. The HBSL for chromium is based on a carcinogenic endpoint. It should be noted, again, that exceedance of the HBSL does not indicate onset of health effects. In addition, for this assessment, the total chromium concentration was assumed to be present as Cr (VI), the most toxic form via inhalation. It is likely that the estimated Cr (VI) concentration would be much lower since it is highly unstable in the environment.

The ratios of estimated carbon monoxide concentrations were below one for each of the five test conditions. However, the ratios resulting from use of the charge M3, when fired from the M199 cannon for zones 3 and 5, were not significantly less than one (0.586 and 0.963, respectively). Since carbon monoxide is not carcinogenic, the health effects of carbon monoxide and chromium cannot be added together.

7.2 ACUTE HEALTH RISK

All test conditions, with the exception of one, had ratios at or below one for the acute assessment. The test condition for which an exceedance occurred was for copper from the charge M3, zone 5, fired from the M199 cannon. All ratios for other substances were below one. The concentration of copper decreased to a safe level when the distance of the hypothetical downwind resident increased from 100 to 200 meters. Therefore, no further evaluation was conducted. Modeled air concentrations for other substances were further decreased when the downwind distance was increased from 100 to 200 meters.

Results indicated that at a distance 100 meters from the firing point location the ratio for copper was 1.26. Acute health effects from exposure to copper can result in eye and respiratory irritation. At the increased distance of 200 meters, the ratio of the estimated copper concentration to its ATV was reduced to 0.52.

7.3 FACT SHEET

Appendix E includes a copy of the fact sheet submitted to the USAEC. The fact sheet used the results from this assessment to summarize health concerns related to inhalation of the air emissions from the 155-mm propelling charge.

8. UNCERTAINTY DISCUSSION

The limitations inherent in modeling and the added conservatism of the evaluation contribute to the uncertainty of the assessment results. In addition, the risk assessment

methodology typically may include safety factors that are embedded in the toxicity data to ensure adequate protection of the general population, particularly, susceptible individuals such as children, the sick, and the elderly. Table 8 identifies various areas of uncertainty related to this assessment.

TABLE 8: TYPES OF UNCERTAINTY

Issue	Uncertainty	Direction of Effect
	Emissions Modeling	
Modeled versus real-time sampling	The air concentrations in this assessment were modeled. Actual air concentrations taken from the field may be higher or lower.	Varies
Hypothetical resident assumed to be located directly downwind	Unless the area around the training facility is populated, the chances that a person living directly downwind is low.	Overestimates
Frequency of use for 155-mm propelling charge	Actual frequency of use of 155-mm propelling charge during training exercises may be different from those stated in this report.	Varies
Using worst-case meteorological conditions	To ensure that this assessment may be applicable to all training areas, worst-case meteorological conditions were used in the air model runs.	Overestimates
	Exposure Assessment	
Estimating time- averaged concentrations	Actual exposure from the 155-mm propelling charge is intermittent. If one were to plot a person's exposure profile, the plot would consist of a series of spikes. Since current risk assessment methodology does not allow the evaluation of potential health risks as a function of time, a single concentration, averaged over the exposure duration was used. In this assessment, the exposure durations used were 30 years and 1-hour or 15 minutes.	Varies
Chromium speciation	All chromium was assumed to be Cr (VI), which is more toxic than Cr (III).	Overestimates
Comparing estimated concentrations to established screening levels	The Region 3 and Region 9 health- based screening levels were developed using different exposure assumptions from those in this assessment. In this case, these assumptions resulted in	Overestimates

Issue	Uncertainty	Direction of Effect
	more conservative screening levels.	
Screening assessment versus calculating an average daily intake	Calculating an average daily intake allows the use of scenario-specific assumptions.	Varies
Exposure to other munitions	Other munitions are typically used during the same training event. These items may contain substances that are similar or different from those detected in the 155-mm propelling charge.	Underestimates
	Toxicity Assessment	
Lack of toxicity data	Some substances were not quantitatively evaluated because they have no known toxicity data.	Underestimates
Modifying and uncertainty factors for toxicity data	Modifying factors and uncertainty factors of varying degree are typically applied to toxicological values. These factors are used to account for different conditions such as extrapolating from animal studies for human health evaluation.	Overestimates
Substances that produce the same toxic endpoint or affect the same target organ	Although conservative assumptions are used in a screening methodology, this approach does not consider exposure to multiple substances. However, unless a substance's concentration compared to its screening level approaches one, a screening assessment is useful as a first-cut evaluation.	Underestimates

9. CONCLUSION

Using conservative assumptions, the assessment indicated that offsite residents who live as close as 200 meters directly downwind from the firing location are safe from inhalation of the air emissions from the 155-mm propelling charge. It is believed that the assumptions contained in this assessment are conservative enough to be protective of all the population including the sick, elderly, and children.

10. RECOMMENDATIONS

At installations where offsite residents are located less than 200 meters from the 155-mm propelling charge firing location, a more site-specific evaluation is recommended. However, it should be noted that at most training installations, training areas are over 1,000 meters (over half a mile) away from populated areas.

The results from this assessment are intended for a hypothetical training facility and actual results may vary depending on site-specific conditions. This assessment used conservative assumptions (e.g., worst-case meteorological conditions) and it is believed that most site-specific analyses would result in even lower concentrations. Therefore, the results from this assessment should be applicable to most training facilities unless site-specific conditions vary significantly.

11. POINT OF CONTACT

Questions about this report should be directed to Ms. Joleen Mobley at 1-800-222-9698 (ext 2953) or (410) 436-2953.

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APPENDIX A
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APPENDIX B AIR DISPERSION MODELING OUTPUT DATA

AIR MODELING OUTPUT DATA FOR CHARGE M3, FIRED FROM THE M199 CANNON, ZONE 3, 100 METERS DOWNWIND

Table B-1: Air Modeling Output Data for Gases, Metals, and Particulates - 100 meter location

	155mm	opyedo charge	455mm nronelling charge M3 (700e 2) M409 canon	nounce of	Als sections of the		
)JOOD	DODIC: D540		release duration (t):	2	rounds
	e N	Net Explosive Weight (NEW) in Ibs.	t (NEW) in lbs. =>	3.28	Unit Concentration (UC):	1.608E-04	1.608E-04 (q/m³)/(q/s)
		Number of Items = 1 SF6 Leak Rate Dilution Factor	Number of Items = 1 ak Rate Dilution Factor =>	0.939			
		* Water Blate of the States of	Collection was	Supplied Supplied	Total Mass of Substance	Average Modeled	Substance
Compound	tual		Average Adjusted Emission Factor	Average Adjusted Emission Factor	Emitted (grams/item)	Concentration for One Round (grams/m³)	Emission Rate for One Round (g/sec)
	(mg/m ₃)	(mg/m³)	EF	(Ib/Ib NEW)	≥	CONC	ER,
Gases							
NH3	3.570E+00	NA	4.120E-02	1.256E-02	1.869E+01	1.503E-03	9.344E+00
CO2	5.580E+01	AN	6.440E-01	1.963E-01	2.921E+02	2.349E-02	1.461E+02
00	1.564E+02	NA	1.805E+00	5.503E-01	8.187E+02	6.583E-02	4.094E+02
NOx (as NO)	1.107E+00	۸A	1.278E-02	3.895E-03	5.795E+00	4.659E-04	2.898E+00
CH4	2.178E+00	NA A	QN	QN	QN	QN	Q
SO2	5.240E-01	NA NA	Q	QN	QN	QN	QN
Combined Particulate							
TSP	6.836E+00	5.300E-02	8.337E-02	2.542E-02	3.782E+01	3.040E-03	1.891E+01
PM10	5.179E+00	4.233E-02	6.313E-02	1.925E-02	2.863E+01	2.302E-03	1.432E+01
PM2.5	2.036E+00	2.400E-02	2.473E-02	7.539E-03	1.122E+01	9.018E-04	5.608E+00
Metals							
Antimony	1.859E-04	4.345E-06	2.231E-06	6.803E-07	1.012E-03	8.138E-08	5.061E-04
Arsenic	3.717E-04	3.091E-06	4.531E-06	1.381E-06	2.055E-03	1.652E-07	1.028E-03
Barium	9.513E-03	3.255E-05	1.165E-04	3.552E-05	5.285E-02	4.249E-06	2.643E-02
Beryllium	7.873E-05	1.649E-06	2	QN	ND	QN	QN
Cadmium	1.608E-04	1.649E-06	1.976E-06	6.024E-07	8.962E-04	7.206E-08	4.481E-04
Chromium	1.400E-03	7.167E-06	1.711E-05	5.218E-06	7.763E-03	6.241E-07	3.881E-03
Cobait	1.247E-04	3.763E-06	1.486E-06	4.530E-07	6.740E-04	5.419E-08	3.370E-04
Copper	1.115E+00	1.159E-03	1.370E-02	4.175E-03	6.212E+00	4.995E-04	3.106E+00
Lead	2.187E-02	6.770E-05	2.680E-04	8.170E-05	1.215E-01	9.773E-06	6.077E-02
Manganese	4.046E-03	3.086E-05	4.935E-05	1.504E-05	2.238E-02	1.800E-06	1.119E-02
Nickel	2.515E-03	1.433E-05	3.073E-05	9.370E-06	1.394E-02	1.121E-06	6.970E-03
Selenium	2.624E-04	5.497E-06	QN	QN	ND	QN	QN
Silver	6.997E-05	1.099E-06	8.600E-07	2.622E-07	3.901E-04	3.136E-08	1.950E-04
Thallium	7.873E-05	1.613E-06	QN	QN	QN	QN.	QN
Zinc	1.596E-01	1,445E-04	1.960E-03	5.977E-04	8.892E-01	7.149E-05	4.446E-01
Footnotes:							

Footnotes:
'ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study)
ND = Not Detected

Table B-2: Air Modeling Output Data for Volatile Organic Compounds - 100 meter location

	4EEmm	onacho pullipuos	12 mm monoilling chomos M3 (2000 2) M400 connect	, connon	(1) aboutor to old	_	phinds
)IGOO	DODIC: D540		release duration (t):	- "2"	2 seconds
	Net	Net Explosive Weight (NEW) in lbs.	(NEW) in lbs. =>	3.28	Unit Concentration (UC):	1.608E-04	1.608E-04 (g/m³)/(g/s)
		SF6 Leak Rate D	Leak Rate Dilution Factor =>	0.939			
		maayeeningoorgaay	lestilkeistille vyk		Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration	Justed actor	Average Adjusted Emission Factor (Ib/Ib NEW)	Emitted (grams/item)	Concentration for One Round (grams/m³)	Emission Rate for One Round (g/sec)
		(mg/m²)	L. U		W	CONC	ER ₁
VOCs							
Dichlorodifluoromethane	3.762E-03	3.762E-03	Q	QN :	QN	Q	Q
Methyl Chloride	1.594E-03	1.594E-03	QN	Q	ΩN	QN	QN
Dichlorotetrafluoroethane	4.683E-03	4.683E-03	Q	QQ	QN	QN	QN
Vinyl Chloride	5.069E-03	5.069E-03	Q	Q.	QN	QN	Q
1,3-Butadiene	1.790E-03	1.790E-03	Q	Q	QN	QN	Q
Methyl Bromide	3.073E-03	3.073E-03	Q	Q	QN	NO.	Q
Ethyl Chloride	2.112E-03	2.112E-03	QN	Q	QN	QQ	QN
Trichlorofluoromethane	3.934E-03	3.934E-03	Q	S	QN	ND	QN
1,1-Dichtoroethene	9.028E-03	6.696E-03	2.867E-05	8.739E-06	1.300E-02	1.045E-06	6.501E-03
Dichloromethane	1.607E-01	5.722E-03	1.904E-03	5.806E-04	8.638E-01	6.945E-05	4.319E-01
3-Chloropropene	2.754E-03	2.754E-03	Q	Q	QN	ND	ND
1,1,2-Trichloro-1,2,2-trifluoroethane	4.965E-03	5.750E-03	QN	QN	QN	ND	QN
1,1-Dichloroethane	3.159E-03	3.159E-03	QN	QN	QN	ND	QN
cis-1,2-Dichloroethene	3.295E-03	3.295E-03	QN	QN	QN	ND	QN
Trichtoromethane	4.099E-03	4.099E-03	Q	ᄝ	ND	ND	QN
1,2-Dichloroethane	3.443E-03	3.443E-03	QN	QN	QN	ON .	QN
1,1,1-Trichloroethane	2.007E-02	1.095E-01	Q	Q	ND	ND	QN
Benzene	5.931E-02	2.329E-03	7.290E-04	2.223E-04	3.307E-01	2.659E-05	1.653E-01
Carbon Tetrachloride	4.529E-03		2	Q	QN	ND	ON
1,2-Dichloropropane	3.419E-03	3.419E-03	Q	QN	QN	ND	ON
Trichloroethene	3.866E-03	3.866E-03	QN	QN	QN	QN	QN
cis-1,3-Dichtoropropene	3.360E-03	3.360E-03	QN	QN	, QN	ND	QN
trans-1,3-Dichloropropene	2.860E-03	2.860E-03	Q	Q	QN	ND	QN
1,1,2-Trichloroethane	3.877E-03	3.877E-03	Q	QN	ND	ND	QN
Toluene	5.333E-03	3.610E-03	2.118E-05	6.456E-06	9.606E-03	7.723E-07	4.803E-03
1,2-Dibromoethane	5.844E-03	5.844E-03	Q	Q	QN	ND	QN
Tetrachloroethene	4.475E-03	4.475E-03	S	Q	ND	ND	ON

Table B-2: Air Modeling Output Data for Volatile Organic Compounds - 100 meter location

	155mm pro	propelling charge DODI	pelling charge M3 (zone 3), M199 cannon DODIC: D540	9 cannon	No. of rounds (I) release duration (t):	1 2	1 rounds 2 seconds
	Net	Net Explosive Weight (NEW) in lbs Number of Items = 1 SF6 Leak Rate Dilution Factor	plosive Weight (NEW) in ibs. => Number of Items = 1 6 Leak Rate Dilution Factor =>	3.28	Unit Concentration (UC):	1.608E-04	1.608E-04 (g/m³)/(g/s)
		1. Aylendinfirlefallikeen	Chilicial (1977)		Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (lb/item) EF	Average Adjusted Emission Factor (Ib/Ib NEW)	Emitted (grams/item) M	Concentration for One Round (grams/m³) CONC	Emission Rate for One Round (g/sec) ER,
Chlorobenzene	2.305E-04	2.305E-04	ON	QN	QN	ND	QN
Ethylbenzene	2.344E-03	2.344E-03	QN	QV	QN	QN	QN
m&p-Xylene	2.257E-03	2.257E-03	QN	QN	QN	QN	QN
Styrene	2.641E-03	2.641E-03	QN	QN	QN	ND	QN
1,1,2,2-Tetrachloroethane	4,466E-03	4.466E-03	QN	QN	ON	QN	ΩŅ
o-Xylene	2.474E-03	2.474E-03	QV	QN	ON	QN	QV
4-Ethyltoluene	2.214E-03	2.214E-03	QN	QN	QN	ND	QN
1,3,5-Trimethylbenzene	2.460E-03	2.460E-03	QN	QN	QN	ND	QN
1,2,4-Trimethylbenzene	2.312E-03	2.312E-03	Q	Q.	ON	ON	QN
Benzyl Chloride	5.076E-03	5.076E-03	ND	QN	QN	QN	QN
m-Dichlorobenzene	3.366E-03	3.366E-03	QN	QN	QN	QN	QN
p-Dichlorobenzene	2.945E-03	2.945E-03	Q	QN	ON	QN	QN
o-Dichlorobenzene	3.606E-03	3.606E-03	QN	2	ON	ON	QN
1,2,4-Trichlorobenzene	4.526E-03	4.526E-03	QN	QN	QN	ON	QN
Hexachlorobutadiene	4.690E-03	4.690E-03	QN	QN	QN	QN	QN
Methane	2.218E+00	1.364E+00	1.050E-02	3.202E-03	4.764E+00	3.831E-04	2.382E+00
Ethane	6.764E-01	6.764E-01	ND D	ON	QN	QN	QN
Ethylene	6.310E-01	6.310E-01	QN	ON	QN	QN	QV
Propane	9.920E-01	9.920E-01	QN	QN	QN	QN	QN
Acetylene	5.858E-01	5.858E-01	S	QN	QN	QN	QN
Isobutane	1.307E+00	1.307E+00	ND	QV	QN	QN	QN
n-Butane	1.307E+00	1.307E+00	ND	QN	QN	QN	QN
Propylene	9.466E-01	9.466E-01	ND	DN	QN	QN	QN
Eootnotee:							

Footnotes:

¹ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study) ND = Not Detected

Table B-3: Air Modeling Output Data for Semi-Volatile Organic Compounds - 100 meter location

	155mm	propelling charge	155mm propelling charge M3 (zone 3), M199 cannon	9 cannon	No. of rounds (I)	1	rounds
		DOD	DODIC: D540		release duration (t):	2	seconds
	Ne	Net Explosive Weigh	osive Weight (NEW) in lbs. =>	3.28	Unit Concentration (UC):	1.608E-04	1.608E-04 (g/m³)/(g/s)
		Number of SF6 Leak Rate D	Number of Items = 1 Leak Rate Dilution Factor =>	0.939			
	the state of the s		Te filmination of	Section of the second	Total Mass of Substance	Average Modeled	Substance
tu tu	200				Emitted	Concentration for	Emission Rate for
Compound	Measured Actual Concentration	Background	Average Adjusted Emission Factor	Average Adjusted Emission Factor	(grams/item)	One Round (grams/m³)	One Round (g/sec)
	(mg/m³)	Concentration (mg/m³)	(ID/item) EF	(Ib/Ib NEW)		CONC	Ŗ
SVOCs							
n-nitrosodimethylamine	2.355E-03	5.605E-05	QN	QN	ON	ON	QN
bis(2-chloroethyl)ether	2.355E-03	5.605E-05	QN	QN	QN	2	Q
phenol	7.294E-03	7.120E-03	2.148E-06	6.548E-07	9.742E-04	7.833E-08	4.871E-04
2-chlorophenol	2.355E-03	5.605E-05	QN	QN	QN	ON	QN
1,3-dichlorobenzene	2.355E-03		QN	QN	ON	ON	QN
1,4-dichlorobenzene	2.355E-03	5.664E-05	QN	QN	QN	QN	QN
1,2-dichlorobenzene	2.355E-03	5.605E-05	QN	Q	ND	QN.	QN
benzyl alcohol	2.355E-03	5.605E-05	ND	Q.	QN	ON	QN
bis(2-chloroisopropyl)ether	2.355E-03		QN	QN	ND	QN	QN
2-methylphenol	2.355E-03		QN	Q	QN	QN	QN
hexachloroethane	2.355E-03	5.605E-05	ND	QV	ND	ND	QN
n-nitroso-di-n-propylamine	2.355E-03	5.605E-05	QN	QN	ND	QN	QN
4-methylphenol	2.355E-03	5.605E-05	ND	ND	QN .	ND	ND
nitrobenzene	2.355E-03		QN	QN	ND	QN	QN
isophorone	2.355E-03	5.605E-05	QN	Q	ΩN	Q.	QN
2-nitrophenol	2.355E-03	3.660E-04	Q	Q	QN	2	Q
2,4-dimethylphenol	2.355E-03	5.605E-05	Q	Q	ND	QN	QN
bis(2-chloroethoxy)methane	2.355E-03	5.605E-05	Q	Q	QN	Q.	Q
2,4-dichlorophenoi	2.355E-03		QN	2	QN	2	Q
1,2,4-trichlorobenzene	2.355E-03		Q	Q	QN	2	ND
naphthalene	3.597E-03	1.366E-04	4.253E-05	1.297E-05	1.929E-02	1.551E-06	9.647E-03
4-chloroaniline	2.355E-02		ND O	임	ND	QN	QN
hexachlorobutadiene	2.355E-03	5,605E-05	ND	Q	ND	ND	QN
4-chloro-3-methylphenol	2.355E-03	5.605E-05	QN	QN	ND	QN .	QN
2-methylnaphthalene	2:355E-03	1.694E-04	QN	ΩN	QN	ON	QN
hexachlorocyclopentadiene	2.355E-03	5.605E-05	Q	QN	ON	QN	QN
2,4,6-trichlorophenol	2.355E-03	5.605E-05	QN	QN	ND	QN	QN

Table B-3: Air Modeling Output Data for Semi-Volatile Organic Compounds - 100 meter location

	155mm prop	propelling charge DODK	elling charge M3 (zone 3), M199 cannon DODIC: D540	eannon cannon	No. of rounds (I) release duration (t):	1 2	1 rounds 2 seconds
	Θ	Net Explosive Weight (NEW) in Ibs. Number of items = 1 SF6 Leak Rate Dilution Factor	re Weight (NEW) in lbs. => Number of items = 1 ak Rate Dilution Factor =>	3.28	Unit Concentration (UC):	1.608E-04	1.608E-04 (g/m³)/(g/s)
		ATCHROS	A Colon of the Unestulister		Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (Ib/Item) EF	Average Adjusted Emission Factor (ib/ib NEW)	Emitted (grams/item) M	Concentration for One Round (grams/m³) CONC	Emission Rate for One Round (g/sec) ER,
2,4,5-trichlorophenol	2.355E-03	5.605E-05	QN	QN	QN	ND	QN
2-chloronaphthalene	2.355E-03	5.605E-05	QN	QN	QN	QN	QN
2-nitroaniline	2.355E-03	5.605E-05	QN	QN	ND	QN	QN
dimethylphthalate	2.355E-03	5.605E-05	QN	QN	QN	QN	QN
2,6-dinitrotoluene	2.355E-03	5.721E-05	QN	QN	ON	QV	QN
3-nitroaniline	4.710E-03	1.121E-04	ND	QN	QN	2	QN
2,4-dinitrophenol	4.710E-03	1.121E-04	QN	QN	QN	QN	QN
dibenzofuran	2.355E-03	7.823E-05	QN	ON	QN	QN ON	QN
2,4-dinitrotoluene	2.355E-03	5.605E-05	ND	ND	QN	QN	QN
4-nitrophenol	4.710E-03	1.316E-04	ON	QN	ON	QN	QN
4-chlorophenyl-phenylether	2.355E-03	5.605E-05	QN	2	QN	QN	QN
diethylphthalate	2.355E-03	5.605E-05	QN	Q.	ND	QN	QN
4-nitroaniline	4.710E-03	1.121E-04	Q	Q	ON	QN	QN
4,5-dinitro-z-methylphenol	4.710E-03	1.121E-04	QN	Q	ON	ND	QN
n-nitrosodiphenylamine(1)	2.355E-03	5.605E-05	Q	QN	QN	QN	QN
4-promophenyi-phenyiether	2.355E-03	5.605E-05	QN	Q	ND	ON	QN
hexachlorobenzene	2.355E-03	5.605E-05	QN	Q	ND	QN	QN
pentachlorophenol	4.710E-03	1.121E-04	9	2	ND	QN	Q
di-n-butylphthalate	2.355E-03	1.080E-04	QN	QN	QN	QN	QN
butylbenzylphthalate	2.355E-03	5.605E-05	QN	QN	QN	QN	QN
bis(2-ethylhexyl)phthalate	1.526E-01	9.023E-04	1.865E-03	5.685E-04	8,458E-01	6.801E-05	4.229E-01
di-n-octylphthalate	2.355E-03	5.605E-05	ND	ON	ON	QN	QN
Footnotes:							

¹ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study) ND = Not Detected

Table B-4: Air Modeling Output Data for Polynuclear Aromatic Hydrocarbons, Dioxins/Furans, Aldehydes, and Acid Gases 100 meter location

					10 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	۲	
	165mm	propelling charge	155mm propelling charge M3 (zone 3), เทา99 cannon	9 cannon	No. of founds (1)		rounds
		IDOD	DODIC: D540		release duration (t):	2	seconds
	Ne	Net Explosive Weight (NEW) in lbs.	t (NEW) in lbs. =>	3.28	Unit Concentration (UC):	1.608E-04	1.608E-04 (g/m³)/(g/s)
		Number	Number of items = 1				
		SF6 Leak Rate D	Leak Rate Dilution Factor =>	0.939			
		different and	COMPLETE STREET	To the state of th	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual	Measured	Average Adjusted	Average Adjusted	Emitted (grams/Item)	One Round	One Round
	Concentration (mg/m³)	Concentration (mg/m³)	(lb/ltem) EF	Emission Factor (Ib/Ib NEW)	×	CONC	ER,
PAHs (TO-13 Method)				٠			
acenaphthylene	4.939E-04	1.328E-06	6.054E-06	1.846E-06	2.746E-03	2.208E-07	1.373E-03
acenaphthene	1.464E-04	9.544E-05	6.269E-07	1.911E-07	2.843E-04	2.286E-08	1.422E-04
fluorene	2.220E-04	6.502E-05	1.930E-06	5.884E-07	8.754E-04	7.038E-08	4.377E-04
phenanthrene	5.217E-04	6.428E-05	5.622E-06	1.714E-06	2.550E-03	2.050E-07	1.275E-03
anthracene	5.075E-05	4.197E-06	5.721E-07	1.744E-07	2.595E-04	2.087E-08	1,298E-04
fluoranthene	3.162E-04	7.852E-06	3.790E-06	1.155E-06	1.719E-03	1.382E-07	8.594E-04
pyrene	8.843E-04	6.908E-06	1.078E-05	3.288E-06	4.892E-03	3,933E-07	2.446E-03
benzo(a)anthracene	4.504E-05	1.390E-07	5.518E-07	1.682E-07	2.503E-04	2.012E-08	1.252E-04
chrysene	4.510E-05	3.878E-07	5.496E-07	1.676E-07	2.493E-04	2.004E-08	1.246E-04
benzo(b)fluoranthene	6.923E-05	2.220E-07	8.482E-07	2.586E-07	3.847E-04	3.093E-08	1.924E-04
benzo(k)fluoranthene	9.756E-05	9.826E-08	1.198E-06	3.652E-07	5.434E-04	4.369E-08	2.717E-04
benzo(a)pyrene	1.560E-04	8.980E-08	1.917E-06	5.843E-07	8.693E-04	6.989E-08	4.347E-04
indeno(1,2,3-cd)pyrene	2.926E-04	1.659E-07	3.595E-06	1.096E-06	1.630E-03	1.311E-07	8.152E-04
dibenz(a,h)anthracene	1.008E-05	5.605E-08	1.238E-07	3.776E-08	5.618E-05	4.517E-09	2.809E-05
benzo(g,h,i)perylene	6.659E-04	2.408E-07	8.181E-06	2.494E-06	3.711E-03	2.984E-07	1.856E-03
Dioxin/Furan Data							
2378-TCDD	4.360E-10	8.000E-12	5.359E-12	1.634E-12	2.431E-09	1.954E-13	1.215E-09
12378-PECDD	1.341E-09	9.000E-12	1.637E-11	4.991E-12	7.426E-09	5.970E-13	3.713E-09
123478-HXCDD	1.989E-09	1.050E-11	2.445E-11	7.453E-12	1.109E-08	8.915E-13	5.544E-09
123678-HXCDD	5.812E-09	1.700E-11	7.122E-11	2.171E-11	3.230E-08	2.597E-12	1.615E-08
123789-HXCDD	5.536E-09	1.550E-11	6.785E-11	2.068E-11	3.077E-08	2.474E-12	1.539E-08
1234678-HPCDD	1.137E-07	2.495E-10	1.395E-09	4.252E-10	6.327E-07	5.087E-11	3.163E-07
OCDD	6.470E-07	1.587E-09	7.932E-09	2.418E-09	3.598E-06	2.893E-10	1.799E-06
2378-TCDF	1.560E-10	1.100E-11	1.782E-12	5.433E-13	8.084E-10	6.499E-14	4.042E-10
12378-PECDF	2.870E-10	1.050E-11	ON	QN	ND	QV	Q
23478-PECDF	1.870E-10	1.550E-11	2.108E-12	6.427E-13	9.561E-10	7.687E-14	4.781E-10
123478-HXCDF	3.965度-10	2.800E-11	4.529E-12	1.381E-12	2.054E-09	1.652E-13	1.027E-09
123678-HXCDF	2.380E-10	1.450E-11	2.747E-12	8.375E-13	1.246E-09	1.002E-13	6.230E-10
123789-HXCDF	3.015E-10	6.000E-12	Q.	Q	ND	QN	QN

Table B-4: Air Modeling Output Data for Polynuclear Aromatic Hydrocarbons, Dioxins/Furans, Aldehydes, and Acid Gases 100 meter location

	I						
	155mm prop	propelling charge	elling charge M3 (zone 3), M199 cannon	9 cannon	No. of rounds (I)	-	rounds
			DODIC: D540		release duration (t):	2	seconds
	Ne	Net Explosive Weight	plosive Weight (NEW) in lbs. =>	3.28	Unit Concentration (UC):	1.608E-04	1.608E-04 (g/m³)/(g/s)
		Number of items = 1 SF6 Leak Rate Dilution Factor	Number of items = 1 ak Rate Dilution Factor =>	0.939			
	12(8) 265(8)	ANODARING METARICAL	Colesie un Chi	1. A.	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (lb/item) EF	Average Adjusted Emission Factor (lb/lb NEW)	Emitted (grams/item) M	Concentration for One Round (grams/m³)	Emission Rate for One Round (g/sec) ER,
234678-HXCDF	2.450E-10	1.200E-11	QN	. QN	QN	QN	QN
1234678-HPCDF	4.119E-09	7.750E-11	4.967E-11	1.514E-11	2.253E-08	1.811E-12	1.126E-08
1234789-HPCDF	6.770E-10	8.000E-12	8.223E-12	2.507E-12	3.730E-09	2.999E-13	1.865E-09
OCDF	1.221E-08	1.105E-10	1.488E-10	4.536E-11	6.748E-08	5.425E-12	3.374E-08
Aldehydes							
Formaldehyde	1.228E-02	1.228E-02	QN	QN	QN	QN	QN
Acetaldehyde	1.802E-02	1.802E-02	QN	QN	QN	QN	QN
Acetone	2.375E-02	4.751E-02	QN ·	QN	QN	QN	QN
Acrolein	2.294E-02	2.294E-02	QN	QN	ON	QN	QN
Proprionaldehyde	2.374E-02	2.374E-02	Q	QN	QN	QN	QN
Crotonaldehyde	2.867E-02	2.867E-02	QN	QN	ND	QN	QN
Butyraldehyde	2.949E-02	2.949E-02	QN	QN	QN	QV	QN
Benzaldehyde	4.340E-02	4.340E-02	QN	QN	QN	S	QN
Isovaleraldehyde	3.523E-02	3.523E-02	NO	QN	QN	QN	QN
Valeraldehyde	3.523E-02	3.523E-02	QN	QN	ND	QN	QN
o,m,p-Tolualdehyde	1.229E-01	9.828E-02	QN	QN	QN	QV	QN
Hexaldehyde	4.097E-02	4.097E-02	QN	QN	ND	QN	QN
2,5-Dimethylbenzaldehyde	4.097E-02	4.097E-02	QN	QN	ND	QN	QN
Acid gases							
Hydrogen fluoride	1.400E-01	1.400E-01	QN	QN	QN	QN	QN
Hydrogen chloride	1.300E-01	1.300E-01	QN	GN .	QN	QN	QN
Hydrogen bromide	1.400E-01	1.400E-01	QN	QN	QN	QV	QN
Nitric Acld	1.400E-01	1.400E-01	QN	ON	QN	S	QN
Phosphoric acid	1.400E-01	1.400E-01	QN	QN	QN	QN	QN
Sulfuric Acid	1.400E-01	1.400E-01	QN	QN	QN	ND	QN
Footnotes:	;						

ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study)
ND = Not Detected

	155mm p	oropelling charge DODI	155mm propelling charge M3 (zone 3), M199 cannon DODIC: D540	9 cannon	No. of rounds (I) release duration (t):	1.	1 rounds 2 seconds
	eN.	Net Explosive Weight	losive Weight (NEW) in lbs. =>	3.28	Unit Concentration (UC):	1.608E-04	1.608E-04 (g/m³)/(g/s)
		Number of SF6 Leak Rate D	Number of items = 1 Leak Rate Dilution Factor =>	0.939			
	2.04	W. VATCHEINE	ATC/FINIGYTest/Régulls 💸	At No.	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (lb/item) EF	Average Adjusted Emission Factor (lb/lb NEW)	Emitted (grams/item) M	Concentration for One Round (grams/m³) CONC	Emission Rate for One Round (g/sec) ER,
Particulate Cyanide and HCN							
Particulate Cyanide	8.000E-02	8.000E-02	QN	Q.	QN	QN	Q
Hydrogen Cyanide	9.500E-01	8.500E-02	1.168E-02	3.560E-03	5.296E+00	4.258E-04	2.648E+00
Energetics Data							
Nitrobenzene	5.021E-01	2.031E-01	QN	QV	QN	Q	QN
2-Nitrotoluene	5.021E-01	2.031E-01	QN	ON	QN	ON	QN
3-Nitrotoluene	5.021E-01	2.031E-01	QN	QN	ND	QN	QN
4-Nitrotoluene	5.021E-01	2.031E-01	QN	QN	ND	QN	QN
Nitroglycerine	5.021E-01	2.031E-01	QN	QN	ND	QN	QN
1,3-Dinitrobenzene	5.021E-01	2.031E-01	QN	ON	QN	Q	Q
2,6-Dinitrotoluene	5.021E-01	2.031E-01	QN	QN	ND	QN	QN
2,4-Dinitrotoluene	5.021E-01	2.031E-01	ON	ND	QN	QN	QV OV
1,3,5-Trinitrobenzene	5,021E-01	2.031E-01	QN	ON	QN	QN	QN
2,4,6-Trinitrotoluene	5.021E-01	2.031E-01	QN	QN	QN	QN	QN
RDX	5.021E-01	2.031E-01	QN	QN	QN	QN	QN
4-Amino-2,6-Dinitrotoluene	5.021E-01	2.031E-01	QN	ON	QN	QN	QN
2-Amino-4,6-Dinitrotoluene	5.021E-01	2.031E-01	QN	QN	QN	QN	Q
Tetryl	5.021E-01	2.031E-01	ON	QN	QN	QN	QN
НМХ	1.004E+00	4.062E-01	QN	QN	QN	QN	QN
Pentaerythritoltetranitrate	1.004E+00	4.062E-01	QN	QN	QN	QN	Q
Dibutyl phthalate	2.510E+01	1.016E+01	QN	QN	ND	QN	Q
Dioctyl phthalate	2.510E+01	1.016E+01	QN	QN	ND	ND	QN
Diphenylamine	1.255E+01	5.078E+00	QN	QN	ND	QN .	QN
Footnotes:							

¹ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study) ND = Not Detected

1/12/01

AIR MODELING OUTPUT DATA FOR CHARGE M3, FIRED FROM THE M199 CANNON, ZONE 3, 200 METERS DOWNWIND

Table B-6: Air Modeling Output Data for Gases, Metals, and Particulates - 200 meter location

			20711 16 2007/ 011		No observed to	*	opuio
			DODIC: DESCRIPTION DODIC: D540	camion	release duration (t):	4	seconds
	. Ne	. Net Explosive Weight (NEW) in Ibs.	t (NEW) in lbs. =>	3.28	Unit Concentration (UC):	6.914E-05	6.914E-05 (g/m³)/(g/s)
		Number of Items = 1	Number of Items = 1	0.939			
	S. C. S.		TOTAL STREET, SECTION	The second secon			
		ं १५ मह्यानियो	ATCHINI) BEURE IIIE		Total Mass of Substance	Average Modeled	Substance Emission Rate for
Compound	Measured Actual	Measured	Average Adjusted	Average Adjusted	(grams/Item)	One Round	One Round
	Concentration (mg/m³)	Concentration (mg/m³)	(lb/item) EF	Emission Factor (Ib/Ib NEW)	Σ	(grams/m)	(g/sec) ER,
Gases							
NH3	3.570E+00	NA	4.120E-02	1.256E-02	1.869E+01	3.230E-04	4.672E+00
CO2	5.580E+01	NA	6.440E-01	1.963E-01	2.921E+02	5.049E-03	7.303E+01
00	1.564E+02	NA	1.805E+00	5.503E-01	8.187E+02	1.415E-02	2.047E+02
NOx (as NO)	1.107E+00	NA .	1.278E-02	3.895E-03	5.795E+00	1.002E-04	1,449E+00
CH4	2.178E+00	NA	QN	DN	ND	QN	QN
802	5.240E-01	NA	ON ·	QN	ON	QN	QN
Combined Particulate							
TSP	6.836E+00	5.300E-02	8.337E-02	2.542E-02	3.782E+01	6,536E-04	9.454E+00
PM10	5.179E+00	4.233E-02	6.313E-02	1.925E-02	2.863E+01	4.949E-04	7.159E+00
PM2.5	2.036E+00	2.400E-02	2.473E-02	7.539E-03	1.122E+01	1.939E-04	2.804E+00
Metals							
Antimony	1.859E-04	4.345E-06	2.231E-06	6.803E-07	1.012E-03	1.750E-08	2.530E-04
Arsenic	3.717E-04	3.091E-06	4.531E-06	1.381E-06	2.055E-03	3.552E-08	5.138E-04
Barium	9.513E-03	3.255E-05	1.165E-04	3.552E-05	5.285E-02	9.135E-07	1.321E-02
Beryllium	7.873E-05	1.649E-06	QN	Q	QN	QN	9
Cadmlum	1.608E-04	1.649E-06	1.976E-06	6.024E-07	8.962E-04	1.549E-08	2.241E-04
Chromium	1.400E-03	7.167E-06	1.711E-05	5.218E-06	7.763E-03	1.342E-07	1.941E-03
Cobalt	1.247E-04	3.763E-06	1.486E-06	4.530E-07	6.740E-04	1.165E-08	1.685E-04
Copper	1.115E+00	1.159E-03	1.370E-02	4.175E-03	6.212E+00	1.074E-04	1.553E+00
Lead	2.187E-02	6.770E-05	2.680E-04	8.170E-05	1.215E-01	2.101E-06	3.039E-02
Manganese	4.046E-03	3.086E-05	4.935E-05	1.504E-05	2.238E-02	3.869E-07	5.596E-03
Nickel	2.515E-03	1.433E-05	3.073E-05	9.370E-06	1.394E-02	2.410E-07	3.485E-03
Selenium	2.624E-04	5.497E-06	ND	QN	ON.	QN	ON
Silver	6.997E-05	1.099E-06	8.600E-07	2.622E-07	3.901E-04	6.743E-09	9.752E-05
Thallium	7.873E-05	1.613E-06	QN	QN	ND	QN	ON
Žinc	1.596E-01	1,445E-04	1.960E-03	5.977E-04	8.892E-01	1.537E-05	2.223E-01
Footnotes:	7 						
ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study)	(for additional inf	ormation on the	data, refer to the	Firing Point Emis:	sions Study)		
ND = Not Detected							

Table B-7: Air Modeling Output Data for Volatile Organic Compounds - 200 meter location

	155mm	propelling charge	155mm propelling charge M3 (zone 3), M199 cannon	9 cannon	No. of rounds (I)	-	rounds
		Idod	DODIC: D540		release duration (t):	4	seconds
	Ne	Net Explosive Weight	osive Weight (NEW) in lbs. =>	3.28	Unit Concentration (UC):	6.914E-05	6.914E-05 (g/m³)/(g/s)
			Number of Items = 1	0 030			
		SF6 Leak Kate D	Î	BCB'O			
	Particular Calebrato Con-			S. S	Total Mass of Substance	Average Modeled	Substance Emission Rate for
Compound	Measured Actual Concentration	Measured Background Concentration	Average Adjusted Emission Factor (lb/item)	Average Adjusted Emission Factor	(grams/ltem)	One Round (grams/m³)	One Round (g/sec)
	(mg/m ₃)	(mg/m³)	EF	(ID/ID NEW)	M	CONC	ER,
VOCs							
Dichlorodifluoromethane	3.762E-03	3.762E-03	QN	QN	ND	8	2
Methyl Chloride	1.594E-03	1.594E-03	QN	QN	ON	2	2
Dichlorotetrafluoroethane	4.683E-03	4.683E-03	QN	QN	DN	ND	QN
Vinyl Chloride	5.069E-03	5.069E-03	QN	QN	ON	QN	QN
1,3-Butadiene	1.790E-03	1.790E-03	QN	QN	ON	2	S
Methyl Bromide	3.073E-03	3.073E-03	ON	Q	ON	QN	Q
Ethyl Chloride	2.112E-03	2.112E-03	QN	2	QN	QN	Q
Trichlorofluoromethane	3.934E-03	3.934E-03	QN	QN	ND	QN	2
1,1-Dichloroethene	9.028E-03	6.696E-03	2.867E-05	8.739E-06	1.300E-02	2.247E-07	3,251E-03
Dichloromethane	1.607E-01	5.722E-03	1.904E-03	5.806E-04	8.638E-01	1.493E-05	2.160E-01
3-Chloropropene	2.754E-03	2.754E-03	QN	QN	QN	QN	2
1,1,2-Trichloro-1,2,2-trifluoroethane	4.965E-03	5.750E-03	QN	QN	ND	S	2
1,1-Dichtoroethane	3.159E-03	3.159E-03	QN	QN	QN	QN	QN
cis-1,2-Dichloroethene	3.295E-03	3.295E-03	QN	QN	ON	QN	Q.
Trichloromethane	4.099E-03	4.099E-03	QN	QN	ND	QN	QN
1,2-Dichloroethane	3.443E-03	3.443E-03	DN	QN	ON	QN	2
1,1,1-Trichloroethane	2.007E-02	1.095E-01	QN	Q	QN	Q	Q
Benzene	5.931E-02	2.329E-03	7.290E-04	2.223E-04	3.307E-01	5.716E-06	8.267E-02
Carbon Tetrachloride	4.529E-03	4.529E-03	Q	2	QN	QN	Q
1,2-Dichloropropane	3.419E-03	3.419E-03	ND	Q	QN	QN	QN
Trichloroethene	3.866E-03	3.866E-03	ON	S	QN	QN	Q
cis-1,3-Dichloropropene	3.360E-03	3.360E-03	QN	QN	QN	QN	Q
trans-1,3-Dichloropropene	2.860E-03	2.860E-03	ND	Q	QN	QN	QN
1,1,2-Trichloroethane	3.877E-03	3.877E-03	QN	QN	QN	QN	QN
Toluene	5,333E-03	3,610E-03	2.118E-05	6.456E-06	9.606E-03	1.660E-07	2.401E-03
1,2-Dibromoethane	5.844E-03	5.844E-03	Q	QN	QN	QN	QN .
Tetrachloroethene	4.475E-03	4.475E-03	QN	QN	QN	QN	QN

Table B-7: Air Modeling Output Data for Volatile Organic Compounds - 200 meter location

	155mm	propelling charge	155mm propelling charge M3 (zone 3), M199 cannon	9 cannon	No. of rounds (f)	1	rounds
		DOD	DODIC: D540		refease duration (t):	4	4 seconds
	Ne	Net Explosive Weight (NEW) in ibs.	it (NEW) in lbs. =>	3.28	Unit Concentration (UC):	6.914E-05	6.914E-05 (q/m³)/(q/s)
		3 Les	Number of Items = 1 ak Rate Dilution Factor =>	0.939			
	A STATE OF THE STA	Conference of the	1910 1219 1210 1110 12 12 13 15 15 15 15 15 15 15 15 15 15 15 15 15	Story to be a first of the second	Total Mass of Substance	Average Modeled	Subadadio
	town dedicates				Emitted	Concentration for	Emission Rate for
Compound	Measured Actual	Measured	Average Adjusted Emission Factor	Average Adjusted	(grams/item)	One Round	One Round
	(mg/m³)	Concentration (mg/m³)	(lb/ltem) EF	(Ib/Ib NEW)	Σ	(grams/m)	(g/sec) ER,
Chlorobenzene	2.305E-04	2.305E-04	Q	S	QN	CN	CN
Ethylbenzene	2.344E-03	2.344E-03	9	Ð	QN	CN	CN
m&p-Xylene	2.257E-03	2.257E-03	Q	QN.	QN	QN	2 2
Styrene	2.641E-03	2.641E-03	QN	S	QN	CN	CN CN
1,1,2,2-Tetrachloroethane	4,466E-03	4.466E-03	QN	S	QN	QN	S
o-Xylene	2.474E-03	2.474E-03	QN	QN	QN	QN	Q
4-Ethyltoluene	2.214E-03	2,214E-03	QN	QV	QN	CN	QN
1,3,5-Trimethylbenzene	2.460E-03	2.460E-03	QN	QN	QN	S.	GN
1,2,4-Trimethylbenzene	2.312E-03	2.312E-03	QN	QN	QN	S	2
Benzyl Chloride	5.076E-03	5.076E-03	QN	ON	QN	2	Q
m-Dichlorobenzene	3.366E-03	3.366E-03	QN	QN	QN	2	Q
p-Dichlorobenzene	2.945E-03	2.945E-03	QN	ΩN	QN	QN	9
o-Dichlorobenzene	3.606E-03	3.606E-03	QN	Q	QN	QV	Q
I,z,4-I richioropenzene Hexachlorahitadiana	4.526E-03	4.526E-03	Q	2	QN	ND	2
Methana	9.09UE+03	4.690E-03	ND 4 OFOT OO	ON LOS	QN	ON	QN
Ethane	8 784E-04	8 784E 04	1.030E-02	3.202E-03	4.764E+00	8.235E-05	1.191E+00
Ethylono	0.1045-01	0.7045-01	ON.	Q.	ON.	Q	2
Denis	6.310E-01	6.310E-01	QN .	Q	QN	QN	QN
rropane	9.920E-01	9.920E-01	QN	2	QN	2	Q
Acetylene	5.858E-01	5.858E-01	Q.	Q	QN	Q	2
Isobutane	1.307E+00	1.307E+00	QN	QN	ND	Q	QN
n-Butane	1.307E+00	1.307E+00	QN	QN	ND	2	CN
Propylene	9.466E-01	9,466E-01	QN	Q	QN	QN N	S
Footnotes:	3 1 1 1 1 1 1 1		i	1			
ALC = ADBITION I DSI CONTOL IOLE	additional informa	tion on the data	refer to the Firing	· Doint Emissions	O. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.		

ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study)

ND = Not Detected

Table B-8; Air Modeling Output Data for Semi-Volatile Organic Compounds - 200 meter location

	155mm t	propelling charge	155mm propelling charge M3 (zone 3), M199 cannon) cannon	No. of rounds (I)	***	rounds
		naoa	DODIC: D540		release duration (t):	4	spuoses
	Ne	Net Explosive Welgh	osive Weight (NEW) in lbs. =>	3.28	Unit Concentration (UC):	6.914E-05	6.914E-05 (g/m³)/(g/s)
		Number					
			Leak Rate Dilution Factor =>	0.939			
		Autolia Solicia est	अरही मितिकारो प्रियान स्थाप्त हैं		Total Mass of Substance	Average Modeled Concentration for	Substance Emission Rate for
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (Ib/Item) EF	Average Adjusted Emission Factor (Ib/lb NEW)	(grams/Item) M	One Round (grams/m³) CONC	One Round (g/sec) ER ₁
SVOCs							
n-nitrosodimethylamine	2.355E-03	5.605E-05	QN	QN	QN	2	QN
his 2-chloroethyllother	2.355E-03	5.605E-05	Q	QN	ND	S.	QN
Dis(z-dilotodilyt)dilot	7 294F-03	7.120E-03	2.148E-06	6.548E-07	9.742E-04	1.684E-08	2.436E-04
prierior 2 objectables	2.355E-03	5.605E-05	QN	QN	ND	2	Q
4.3 dichlorobanzana	2.355E-03	5.605E-05	QN	QN	ND	2	Q
1.3-dichlorohapzana	2,355E-03	5.664E-05	QN	QN	ND	2	Q
1 2-dichlorobanzene	2,355E-03	5.605E-05	Q	ON	ON	2	QN !
henzyl alcohol	2.355E-03	5.605E-05	QN	QN	QN	Q	QN
his/2-chlorolaonronyl)ether	2.355E-03	5.605E-05	QN	QN	ΩN	Q	QN !:
2-methylphenol	2.355E-03	5.605E-05	QN	QN	QN	Q	QN.
hexachloroethane	2.355E-03	5.605E-05	QN	ON	QN	QN	QN.
n-nitroso-di-n-propylamine	2.355E-03	5.605E-05	QN	QN	ND	Q	QN
4-methylphenol	2.355E-03	5.605E-05	QN	ON	QN	QN	2
pitrobanzena	2.355E-03	5.605E-05	Q	QN	QN	Q	QN.
isonhorone	2.355E-03	5.605E-05	ON	QN	QN	9	ON S
2-nitrophenol	2.355E-03	3.660E-04	QN	QN	QN	Q S	2 2
2,4-dimethylphenol	2.355E-03	5.605E-05	QN	Q	ON .	2 2	22
bis(2-chloroethoxy)methane	2.355E-03	5.605E-05	Q	Q		2 2	S CN
2,4-dichlorophenol	2.355E-03	5.605E-05	Q	QN			
1,2,4-trichlorobenzene	2.355E-03	5.605E-05	QN	Q	ON CONTRACT	ND OO O	UND HOUSE OF
naphthalene	3,597E-03	1.366E-04	4.253E-05	1.297E-05	1.929E-02	3.3335-07	4.023E-03
4-chloroaniline	2.355E-02	5.605E-04	QN	QN	QN	2 2	2 2
hexachlorobutadlene	2.355E-03	5.605E-05	QN	QN	QN		ON S
4-chloro-3-methylphenol	2.355E-03	5.605E-05	QN	Q.	QN	ON S	ON CA
2-methylnaphthalene	2.355E-03	1.694E-04	Q	Q	O.	2	2 2
hexachlorocyclopentadlene	2.355E-03	5.605E-05	QN	QN	QN	ON S	O Z
2.4.6-trichlorophenol	2.355E-03	5.605E-05	<u>Q</u>	Q	ON	ON	QN

B-13

Table B-8: Air Modeling Output Data for Semi-Volatile Organic Compounds - 200 meter location

	155mm pro	propelling charge	pelling charge M3 (zone 3), M199 cannon DODIC: D540	9 cannon	No. of rounds (t):	1	rounds
	N _B	Net Explosive Weight (NEW) in ibs.	t (NEW) in lbs. =>	3.28	Unit Concentration (UC):	6.914E-05	6.914E-05 (g/m³)/(g/s)
		Number of Items = 1 SF6 Leak Rate Dilution Factor	Number of Items = 1 ik Rate Dilution Factor =>	0.939			
		JUJE ISYLE			Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual	Measured	Average Adjusted	Average Adjusted	Emitted (grams/item)	Concentration for One Round	Emlssion Rate for One Round
	Concentration (mg/m³)	Concentration (mg/m³)	(lb/ltem) EF	Emission Factor (Ib/Ib NEW)	Σ	(grams/m³) CONC	(g/sec) ER ₁
2,4,5-trichlorophenol	2.355E-03	5.605E-05	QN	QN	QN ON	CN	CN
2-chloronaphthalene	2.355E-03	5.605E-05	QN	QN	QN	NO.	S
Z-nitroaniline	2.355E-03	5.605E-05	QN	QN	QN	Q.	Q
dimetnyiphthalate	2.355E-03	5.605E-05	Q	QN	QN	N	Q
2,0-ullifotoluene	2.355E-03	5.721E-05	Q	Q	QN	QN	QN
2.4 distractions	4.710E-U3	1.121E-04	Q	Q.	QN	Q	QN
z,4-diniropnenoi	4.710E-03	1.121E-04	2	Q	QN	QN	QN
2 A dinitratelione	Z.355E-03	7.823E-05	QN	2	QN	S.	QN
4-nifronhandi	4.355E-03	5.605E-05	Q	2	ND	QN	QN
4-chloronhanyl-nhanylether	2 255E 03	1.310E-04	Q S	2	Q	QN	QN
diethvinhthalate	2 2555 02	5.003E-05	2 2	2	QN	Q	ND
4-nitroanillne	4 710E-03	3.003E-03	2 2	Q G	2	QN	QN
4,6-dinitro-2-methylphenol	4.710E-03	1.121E-04	2 2	2 2	2 2	9	QN
n-nitrosodiphenylamine(1)	2.355E-03	5.605E-05	S	202	S	2 5	2 2
4-bromophenyl-phenylether	2.355E-03	5.605E-05	Q.	Q	QV	CZ	2 2
hexachlorobenzene	2.355E-03	5.605E-05	DN	QV	ON	QN	2 2
pentachlorophenol	4.710E-03	1.121E-04	QN	Q	QN	CN	
di-n-butyiphthalate	2.355E-03	1.080E-04	QN	Q	QN	CZ	2 2
butylbenzylphthalate	2.355E-03	5.605E-05	ON	S	QN	QN	2 2
bis(2-ethylhexyl)phthalate	1.526E-01	9.023E-04	1,865E-03	5,685E-04	8,458E-01	1.462E-05	2.115F-01
di-n-octylphthalate	2.355E-03	5.605E-05	QN	QN	QN	QN	ND ON
Footnotes:							

¹ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study) ND = Not Detected

1/16/01

Table B-9: Air Modeling Output Data for Polynuclear Aromatic Hydrocarbons, Dioxins/Furans, Aldehydes, and Acid Gases 200 meter location

ZUU METET IOCAUON	l		07.11		No of rounds (I)	1	rounds
	155mm	propelling charge DODI(155mm propelling charge wil (2016 3), wils carrion DODIC: D540		release duration (t):	4	seconds
	Ne	Net Explosive Weight (NEW) in Ibs.	t (NEW) in lbs. =>	3.28	Unit Concentration (UC):	6.914E-05	6.914E-05 (g/m³)/(g/s)
		Number		020			
		SF6 Leak Rate Dilution Factor	Illution Factor =>	0.838		Language of the second	0.4.0
		May a light of the	MICHALIA		Total Mass of Substance	Average Modeled Concentration for	Substance Emission Rate for
Compound	Measured Actual Concentration	Measured Background	Average Adjusted Emission Factor	Average Adjusted Emission Factor	(grams/ltem)	One Round (grams/m³)	One Round (g/sec)
	(mg/m ₃)	(mg/m³)	EF	(ib/ib NEW)	Σ	CONC	ER,
PAHs (TO-13 Method)				-		00 1111	A 966E 04
acenanhthvlene	4.939E-04	1.328E-06	. 6.054E-06	1.846E-06	2.746E-03	4.747E-08	7 100E-04
acenaphthene	1.464E-04	9.544E-05	6.269E-07	1.911E-07	2.843E-04	4.9100-09	7.103E-03
Biorene	2.220E-04	6.502E-05	1.930E-06	5.884E-07	8.754E-04	1.513E-08	2.100E-04
phenanthrene	5.217E-04	6.428E-05	5.622E-06	1.714E-06	2.550E-03	4.4005-00	0.37.3E-04
anthracene	5.075E-05	4.197E-06	5.721E-07	1.744E-07	2.595E-04	4,480E-09	0.400E-03
fluoranthene	3.162E-04	7.852E-06	3.790E-06	1.155E-06	1.719E-03	2.971E-00	4.29/E-04
nvrene	8.843E-04	6.908E-06	1.078E-05	3.288E-06	4.892E-03	8.455E-06	2 258E 05
henzo(a)anthracene	4,504E-05	1.390E-07	5.518E-07	1.682E-07	2.503E-04	4.327E-U9	6.230E-03
chrysene	4.510E-05	3.878E-07	5.496E-07	1.676E-07	2.493E-04	4.3090-09	0.4362-05
henzo(h)fluoranthene	6.923E-05	2,220E-07	8.482E-07	2.586E-07	3.847E-04	60-30C9-08	9.010E-03
hanzo(k)filoranthana	9.756E-05	9.826E-08	1.198E-06	3.652E-07	5.434E-04	9.392E-09	0.4705.04
henzo(a)pyrene	1.560E-04	8.980E-08	1.917E-06	5.843E-07	8.693E-04	1.5035-06	4 076E 04
Indeno(1.9.3-cd)nyrene	2.926E-04	1.659E-07	3.595E-06	1.096E-06	1.630E-03	2.818E-UB	4.0705-04
dhenz(a hlanthracene	1.008E-05	5.605E-08	1.238E-07	3.776E-08	5.618E-05	9.710E-10	1.404E-05
henzo(a h I)perviene	6.659E-04	2.408E-07	8.181E-06	2.494E-06	3.711E-03	6.415E-08	9.Z/8E-04
Dioxin/Furan Data					COL	4 0045 44	8 077E 40
2378-TCDD	4.360E-10	8.000E-12	5.359E-12	1.634E-12	Z.431E-09	4.201E-14	1 856F-09
12378-PECDD	1.341E-09	9.000E-12	1.637E-11	4.991E-12	1 1005-08	1.917E-13	2.772E-09
123478-HXCDD	1.989E-09	1.050E-11	7.4435-11	0 4745-44	3 230E-08	5.584E-13	8.076E-09
123678-HXCDD	5.812E-09	1.700E-11	A 795E 11	2 068E-11	3.077E-08	5.319E-13	7.694E-09
123789-HXCDD	5.536E-09	1.550E-11	1 2055-11	4 252F-10	6.327E-07	1.094E-11	1.582E-07
1234678-HPCDD	1.137E-07	Z.493E-10	1.3935-09	2 4485_00	3 598F-06	6.219E-11	8.995E-07
OCDD	6.470E-07	1.587E-09	1.932E-09	E 423E 42	8 084E-10	1.397E-14	2.021E-10
2378-TCDF	1.560E-10	1.100E-11	1./0ZE-1Z	0,4355-13	CN	CZ	QN
12378-PECDF	2.870E-10	1.050E-11	UN COL	ND 6 407E 43	0 5645-10	1.653E-14	2.390E-10
23478-PECDF	1.870E-10	1.550E-11	2.108E-12	4 2045 42	2.054E_09	3.551E-14	5,136E-10
123478-HXCDF	3.965E-10	2.800E-11	4.529E-12	0.3755.13	1 246F-09	2,154E-14	3,115E-10
123678-HXCDF	2.380E-10	1.450E-11	2./4/5-12	ND AID	CN	QN	QN
123789-HXCDF	3.015E-10	6.000E-12	QV.	25.			

Table B-9: Air Modeling Output Data for Polynuclear Aromatic Hydrocarbons, Dioxins/Furans, Aldehydes, and Acid Gases 200 meter location

	465	and and leading	, 610 / 3/ 6140/				
		DOD!	DODIC: D540	e carmon	release duration (t):	-∵4	rounds
	Ν	Net Explosive Weight (NEW) in Ibs.	it (NEW) in lbs. =>	3.28	Unit Concentration (UC):	6.914E-05	6.914E-05 (a/m³)/(a/s)
		Number of Items = 1 SF6 Leak Rate Dilution Factor	Number of Items = 1 ak Rate Dilution Factor =>	0.939			
		es establishment in the	N-CORECTMENT	September 1	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual	Measured Background	Average Adjusted Emission Factor	Average Adjusted	Emitted (grams/item)	Concentration for One Round	Emission Rate for One Round
	(mg/m³)	Concentration (mg/m³)	(lb/ltem) EF	(Ib/Ib NEW)	Σ	CONC	ER,
234678-HXCDF	2.450E-10	1.200E-11	2	ND.	QN	QN	CN
1234678-HPCDF	4.119E-09	7.750E-11	4.967E-11	1.514E-11	2.253E-08	3.894E-13	5.632E-09
1234789-HPCDF	6.770E-10	8.000E-12	8.223E-12	2.507E-12	3.730E-09	6,447E-14	9.324E-10
OCDF	1.221E-08	1.105E-10	1.488E-10	4.536E-11	6.748E-08	1.166E-12	1.687E-08
Aldehydes							
Formaldehyde	1.228E-02	1.228E-02	Q	Q	QN	QV	QN
Acetaldehyde	1.802E-02	1.802E-02	QN	QN	QN	QV	S
Acetone	2.375E-02	4.751E-02	QN	QN	QN	S	S.
Acrolein	2.294E-02	2.294E-02	QN	QN	QN	QN	QN
Proprionaldehyde	2.374E-02	2.374E-02	QN	QN	QN	QN	QN
Crotonaldehyde	2.867E-02	2.867E-02	QN	QN	QN	QN	Q
Butyraldehyde	2.949E-02	2.949E-02	QN	QN	QN	QN	QN
Benzaldehyde	4.340E-02	4.340E-02	QN	QN	QN	QN	QN
Isovaleraidehyde	3.523E-02	3.523E-02	Q	QN	ND	QN	QN
Valeraidehyde	3.523E-02	3.523E-02	2	Ð	QN	ND	QN
o,m,p+1 ojuaidenyde Llosofdohisdo	1.229E-01	9.828E-02	Q	2	QN	QN	QN
nexalderlyde 2 F Di At II	4.097E-02	4.097E-02	Q !	Q	QN	ND	QN
z,5-Ullietifylbenzaldenyde	4.097E-02	4.097E-02	QN	QN	QN	ND	QN
Acid gases							
Hydrogen fluoride	1.400E-01	1.400E-01	QN	QN	QN	QN	QN
Hydrogen chloride	1.300E-01	1.300E-01	QN	QN	QN	QN	Q
Hydrogen bromide	1.400E-01	1.400E-01	QN	QN	QN	QN	QN
Nitric Acid	1.400E-01	1.400E-01	Q	QN	QN	Q	Q
Phosphoric acid	1.400E-01	1.400E-01	QN	QN	QN	QN	QN
Sulfuric Acid	1.400E-01	1.400E-01	QV	QN	QN	ND	QN
Footnotes:	5						

^{&#}x27;ATC = Aberdeen Test Center (for addittonal information on the data, refer to the Firing Point Emissions Study)
ND = Not Detected

Table B-10: Air Modeling Output Data for Cyanide and Energetics - 200 meter location

	155mm prop	propelling charge DODI	əliing charge M3 (zone 3), M199 cannon DODIC: D540	9 cannon	No. of rounds (I) release duration (t):	4	1 rounds 4 seconds
	ΘN.	Net Explosive Weigh Number SF6 Leak Rate C	losive Weight (NEW) in ibs. => Number of Items = 1 Leak Rate Dilution Factor =>	3.28	Unit Concentration (UC):	6.914E-05	6.914E-05 (g/m³)/(g/s)
	A CONTRACTOR		rectaling retains one 5%		Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (Ib/item) EF	Average Adjusted Emission Factor (Ib/Ib NEW)	Emitted (grams/item) M	Concentration for One Round (grams/m³)	Emission Kate for One Round (g/sec) ER,
Particulate Cyanide and HCN				•			
Particulate Cyanide	8.000E-02	8.000E-02	QN	QN	QN	QN	ND
Hydrogen Cyanide	9.500E-01	8.500E-02	1.168E-02	3.560E-03	5,296E+00	9.155E-05	1.324E+00
Energetics Data							
Nitrobenzene	5.021E-01	2.031E-01	QN	Q	QN	Q	2
2-Nifrotoluene	5.021E-01	2.031E-01	Q	QN	QN	QV	ΩN
3-Nitrotoluene	5.021E-01	2.031E-01	QN	QN	QN	ON	ND
4-Nitrotoluene	5.021E-01	2.031E-01	QN	QN	QN	ON	ND
Nitroglycerine	5.021E-01	2.031E-01	QN	ON	ND	QN	ND
1,3-Dinitrobenzene	5.021E-01	2.031E-01	QN	QN	QN	QN	ND
2,6-Dinitrotoluene	5.021E-01	2.031E-01	QN	QN	QN	QN	QN
2,4-Dinitrotoluene	5.021E-01	2.031E-01	QN	QN	QN ·	S	ON
1,3,5-Trinitrobenzene	5.021E-01	2.031E-01	QN	QN	QN	QN	<u>Q</u>
2,4,6-Trinitrotoluene	5.021E-01	2.031E-01	Q	QN	Q	Q	2
RDX	5.021E-01	2.031E-01	ND	Q	QN	Q	Q.
4-Amino-2,6-Dinitrotoluene	5.021E-01	2.031E-01	QN	QN	ND	QN	ND
2-Amino-4,6-Dinitrotoluene	5.021E-01	2.031E-01	QN	QN	QN	ON	ON
Tetryl	5.021E-01	2.031E-01	QN	ΩN	QN	QN	ND
HMX	1.004E+00	4.062E-01	QN	QN	QN	QN	QN
Pentaerythritoltetranitrate	1.004E+00	4.062E-01	QN	ON	ND	QN	QN
Dibutyl phthalate	2.510E+01	1.016E+01	QN	QN	ND	QN	QN
Dioctyl phthalate	2.510E+01	1.016E+01	S	QN	QN	QN	QN
Diphenylamine	1.255E+01	5.078E+00	QN	QN	ND	QN	QN ND

Footnotes:

'ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study)
ND = Not Detected

AIR MODELING OUTPUT DATA FOR CHARGE M3, FIRED FROM THE M284 CANNON, ZONE 3, 100 METERS DOWNWIND

Table B-11: Air Modeling Output Data for Gases, Metals, and Particulates - 100 meter location

	155mm prop	propelling charge DODI	elling charge M3 (zone 3), M284 cannon DODIC: D540	4 cannon	No. of rounds (I) release duration (t):	1	rounds
	eZ.	Net Explosive Weight (NEW) in ibs	t (NEW) in ibs. =>	3.28	Unit Concentration (UC):	1.608E-04	1.608E-04 (g/m³)/(g/s)
		Number of Items = 1 SF6 Leak Rate Dilution Factor	Number of Items = 1 ak Rate Dilution Factor =>	0.896			
		Anthropics, S	And allustrating and		Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (lb/ltem) EF	Average Adjusted Emission Factor (Ib/lb NEW)	Emitted (grams/item) M	Concentration for One Round (grams/m³) CONC	Emission Rate for One Round (g/sec) ER ₁ .
Gases							
NH3	3.780E+00	NA	4.363E-02	1.330E-02	1.979E+01	1.591E-03	9.894E+00
CO2	6.480E+01	NA	7.479E-01	2.280E-01	3.392E+02	2.727E-02	1.696E+02
00	1.679E+02	NA	1.938E+00	5.908E-01	8.790E+02	7,067E-02	4.395E+02
NOx (as NO)	1.353E+00	NA	1.562E-02	4.761E-03	7.083E+00	5.695E-04	3.541E+00
CH4	2.178E+00	NA	Q	QN	QN	QN	QN
SO2	5.240E-01	NA	QN	QN	QN	Q	S
Combined Particulate							
TSP	4.514E+00	5.300E-02	5.746E-02	1.752E-02	2.606E+01	2.096E-03	1.303E+01
PM10	3.875E+00	4.233E-02	4.937E-02	1.505E-02	2.239E+01	1.800E-03	1.120E+01
PM2.5	2.074E+00	2.400E-02	2.641E-02	8.050E-03	1.198E+01	9.630E-04	5,989E+00
Metals							
Antimony	1.819E-04	4.345E-06	QN	QN	QN	2	QN
Arsenic	2.814E-04	3.091E-06	3.585E-06	1.093E-06	1.626E-03	1.308E-07	8.131E-04
Barlum	2.814E-03	3.255E-05	3.583E-05	1.092E-05	1.625E-02	1.307E-06	8.126E-03
Beryllum	7.796E-05	1.649E-06	QN	QN	QN	QN	QN
Cadmium	7.796E-05	1.649E-06	2	Q	QN	QN	ΩN
Chromium	4.978E-04	7.167E-06	6.320E-06	1.927E-06	2.867E-03	2.305E-07	1.433E-03
Cobalt	8.659E-05	3.763E-06	1.067E-06	3.253E-07	4.839E-04	3.891E-08	2.420E-04
Copper	2.598E-01	1.159E-03	3.331E-03	1.016E-03	1.511E+00	1,215E-04	7.555E-01
Lead	2.381E-02	6.770E-05	3.059E-04	9.325E-05	1.387E-01	1.115E-05	6.937E-02
Manganese	1.992E-03	3.086E-05	2.526E-05	7.700E-06	1.146E-02	9.211E-07	5.728E-03
Nickel	8.659E-04	1.433E-05	1.097E-05	3.344E-06	4.975E-03	4.000E-07	2,488E-03
Selenium	2.599E-04	5.497E-06	QN	QN	QN	QN	Q
Silver	5.197E-05	1.099E-06	QN	QN	QN	QN	Q
Thalllum	7.796E-05	1.613E-06	QN	ON	QN	QN	QN
Zinc	4.544E-02	1.445E-04	5.835E-04	1.779E-04	2.647E-01	2.128E-05	1.323E-01
Footnotes:	7 4.						

Footnotes: \ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study)
\ND = Not Detected

Table B-12: Air Modeling Output Data for Volatile Organic Compounds - 100 meter location

,	тээшш ргор	oronelling charge	elling charge M3 (zone 3), Mz64 cannon				
,		NGOO	DODIC: D540		release duration (t):	. 2	seconds
·	Ne	Net Explosive Weight (NEW) in Ibs.	t (NEW) in ibs. =>	3.28	Unit Concentration (UC):	1.608E-04 (g/m³)/(g/s)	(s/b)/(c _w /b)
		Number of Items = 1 SF6 Leak Rate Dilution Factor	Number of Items = 1 sk Rate Dilution Factor =>	0.896			
		Contract Sections	Mention of the state of	The second secon	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration	Average Adjusted Emission Factor (lb/ltem) EF	Average Adjusted Emission Factor (lb/lb NEW)	(grams/Item)	One Round (grams/m³)	Cone Round (g/sec)
* JOA							
Nothern differentiations	2 7825 02	2 760E 03	CIV	CN CN	CN	CIN	5
Methyl Chloride	1.594E-03	1.594E-03	2	Q.	Q	Q	200
Dichlorotetrafluoroethane	4.683E-03	4.683E-03	QN	QN	QN	QN	QN
Vinyl Chloride	5.069E-03	5.069E-03	QN	QN	QN	ND	QN
1,3-Butadiene	1.790E-03	1.790E-03	QN	QN	QN	QN	QN
Methyl Bromide	3.073E-03	3.073E-03	QN	QN	ND	QN	ON
Ethyl Chloride	2.112E-03	2.112E-03	QN	QN	ND	ON	QN
Trichlorofluoromethane	3.934E-03	3.934E-03	QN	QN	ON	ND	QN
1,1-Dichloroethene	9.339E-03	6.696E-03	3.405E-05	1.038E-05	1.544E-02	1.242E-06	7.722E-03
Dichloromethane	2.436E-01	5.722E-03	3.064E-03	9.341E-04	1.390E+00	1.117E-04	6.948E-01
3-Chloropropene	2.754E-03	2.754E-03	QN	QN	ON	QN	QN
1,1,2-Trichloro-1,2,2-trifluoroethane	5.148E-03	5.750E-03	QN	QN	ON	QN	QN
1,1-Dichloroethane	3.159E-03	3.159E-03	QN	QN	ON	QN	QN
cls-1,2-Dichloroethene	3.295E-03	3.295E-03	QN	QN	ON.	QN	QN
Trichloromethane	4,099E-03	4.099E-03	QN	QN	QN	ND	QN
1,2-Dichloroethane	3.443E-03	3.443E-03	QN	QN	ON	ND	QN
1,1,1-Trichloroethane	7.867E-02	1.095E-01	Q.	2	QN	QN	Q
Benzene	4.807E-02	2.329E-03	6.192E-04	1.888E-04	2.808E-01	2.258E-05	1.404E-01
Carbon Tetrachloride	4.529E-03	4.529E-03	QN	QN	QN	ON	QN
1,2-Dichloropropane	3.419E-03	3.419E-03	QN	QN	ON	QN	GN
Trichloroethene	3,866E-03	3.866E-03	QN	QN	QN	QN	QN
cis-1,3-Dichloropropene	3.360E-03	3.360E-03	QN	QN	QN	QN	QN
trans-1,3-Dichloropropene	2.860E-03	2.860E-03	QN	QN	QN	ND	QN
1,1,2-Trichloroethane	3.877E-03	3.877E-03	QN	QN	QN	QN	QN
Toluene	4,247E-03	3.610E-03	8.207E-06	2.502E-06	3.723E-03	2.993E-07	1,861E-03
1,2-Dibromoethane	5.844E-03	5.844E-03	QN	QN	QN	QN	QN
Tetrachloroethene	4.475E-03	4.475E-03	Q	Q	QN	QN	2

Table B-12: Air Modeling Output Data for Volatile Organic Compounds - 100 meter location

	155mm	propelling charge	i55mm propelling charge M3 (zone 3), M284 cannon กอกเ∈: กรผ	4 cannon	No. of rounds (I)	1	rounds
			- 1		release dulation (t).	7	seconds
	<u>Φ</u>	Net Explosive Weight (NEW) in ibs. Number of Items = 1 SER 100k Date Dilution Eacher	/e Weight (NEW) in lbs. => Number of Items = 1	3.28	Unit Concentration (UC):	1.608E-04	1.608E-04 (g/m³)/(g/s)
		SFO LEAN NAIB L		0.030			
		HITTO AND SHIPPING SA	NAME OF PARTIES AS	A CONTRACT	Total Mass of Substance	Average Modeled	Substance
•	Measured Actual	Measured	Average Adjusted	Action Administra	Emitted (grams/item)	Concentration for One Round	Emission Rate for One Round
Compound	Concentration	Background Concentration	Emission Factor	Emission Factor		(grams/m³)	(aksec)
	(mg/m ₃)	(mg/m³)	EF	(lb/lb NEW)	Σ	CONC	ER,
Chlorobenzene	2.305E-04	2.305E-04	GN .	QN	QN	QN	Q
Ethylbenzene	2.344E-03	2.344E-03	QN	QN	QN	QN	QN
m&p-Xylene	2.257E-03	2.257E-03	QN	QN	QN	QN	QN
Styrene	2.641E-03	2.641E-03	QN	QN	QN	QN	Q
1,1,2,2-Tetrachioroethane	4.466E-03	4.466E-03	QN	QN	QN	ΩN	QN
o-Xylene	2.474E-03	2.474E-03	ON	ND	QN	QN	Q
4-Ethyltoluene	2.214E-03	2.214E-03	QN	QN	ND	QN	QV.
1,3,5-Trimethylbenzene	2.460E-03	2,460E-03	QV	QN	QN	QN	QN
1,2,4-Trimethylbenzene	2.312E-03	2,312E-03	S	Q	ND	ND	QN
Benzyl Chloride	5.076E-03	5.076E-03	Q	9	ON	QN	QN
m-Dichlorobenzene	3,366E-03	3.366E-03	ND	ND	QN	QN	QN
p-Dichlorobenzene	2.945E-03	2.945E-03	Q	QN	QN	QN	Q
o-Dichlorobenzene	3.606E-03	3.606E-03	ND	QN	QN	QN	Q
1,2,4-Trichlorobenzene	4.526E-03	4.526E-03	Q	Q	QN	ND	QN
Hexachlorobutadiene	4.690E-03	4.690E-03	QV	Q	QN	ND	QN
Methane	2.023E+00	1.364E+00	8.488E-03	2.588E-03	3.850E+00	3.095E-04	1.925E+00
Ethane	6.764E-01	6.764E-01	DN	QN	QN	QN	QN.
Ethylene	6.310E-01	6.310E-01	QN	QN	QN	ND	QN
Propane	9.920E-01	9.920E-01	ON	QN	QN	QN	9
Acetylene	5.858E-01	5.858E-01	ON	QN	QN	S	Q
Isobutane	1.307E+00	1.307E+00	QN	QN	QN	QN	Q
n-Butane	1.307E+00	1.307E+00	ND	QN	ΩN	QN	9
Propylene ·	9.466E-01	9.466E-01	QN	ON	QN	QN	9
Footnotes:							

Footnotes:

'ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study)
ND = Not Detected

	155mm	propelling charge	155mm propelling charge M3 (zone 3), M284 cannon	4 cannon	No. of rounds (I)	← c	rounds
		1000			Telease durauoit (t).	7 1000	seconds
	e Z	Net Explosive Weigh	osive Weight (NEW) in lbs. =>	3.28	Unit Concentration (UC):	1.608E-04	1.608E-04 (g/m³)/(g/s)
		Number of Bate L	Number of Items = 1	0.896			
		OI O LOGN MAIO L	, .	A SALAMAN AND A			
		Section (Internal	e confillent the party		Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration	Average Adjusted Emission Factor (lb/item) EF	Average Adjusted Emission Factor (ib/ib NEW)	Emitted (grams/item) M	One Round (grams/m³)	Cimission Rate for One Round (g/sec) FR.
SVOCs							
n-nitrosodimethylamine	2.572E-03	2.236E-03	QN	QV	QN	QV	QN
bis(2-chloroethyl)ether	2.572E-03	2.236E-03	QN	Q	QN	Q	Q
phenol	2.058E-02	1.923E-02	1.743E-05	5.314E-06	7.906E-03	6.357E-07	3.953E-03
2-chlorophenol	2.572E-03	2.236E-03	QN	QN	QN	QN .	QN
1,3-dichlorobenzene	2.572E-03		Q	Q	QN	ND	QN
1,4-dichlorobenzene	2.572E-03	2.236E-03	QN	QN	ND	ND	QN
1,2-dichlorobenzene	2.572E-03		QN	QN	ND	ND	QN
benzył ałcohol	2.572E-03	2.236E-03	QN	QN	ND	ND	ND
bis(2-chloroisopropyl)ether	2.572E-03		QN	QN	ND	ND	QN
2-methylphenol	2.572E-03	2.236E-03	QN	QN	QN	ND	QN
hexachloroethane	2.572E-03	2.236E-03	QN	QN	QN	ND	QN
n-nitroso-di-n-propylamine	2.572E-03	2.236E-03	QN	QN	ND	ND	QN
4-methylphenol	2.572E-03	2.236E-03	QN	QN	QN	QN	QN
nitrobenzene	2.572E-03	2.236E-03	QN	ND	QN	QN	QN.
isophorone	2.572E-03		QN	QN	QN	QN	QN
2-nitrophenol	2.572E-03	2.236E-03	QN	ΩN	QN	ND	QN
2,4-dimethylphenol	2.572E-03	2.236E-03	Q	S	ON	ND	QN
bis(2-chloroethoxy)methane	2.572E-03	2.236E-03	Q	QN.	ND	ND	QN
2,4-dichlorophenol	2.572E-03	2,236E-03	QN	Q	ND	ND	QN
1,2,4-trichlorobenzene	2.572E-03	2.236E-03	QN	QV	QN	ND	QN
naphthalene	3.659E-03	2.236E-03	4.713E-05	1.437E-05	2.138E-02	1.719E-06	1.069E-02
4-chloroaniline	2.572E-02	2.236E-02	QN	QN	QN	ND	QN
hexachlorobutadiene	2.572E-03	2.236E-03	Q	Ω	ND	QN	QN
4-chloro-3-methylphenol	2.572E-03	2.236E-03	Q	Q	ND	ND	QN
2-methylnaphthalene	2.572E-03	2.236E-03	Q	S	QN	QN	QN
hexachlorocyclopentadiene	2.572E-03	2,236E-03	Q	Q	QN	QN	Q
2,4,6-trichlorophenol	2.572E-03	2.236E-03	QN	QN	QN	QN	QN

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Table B-13: Air Modeling Output Data for Semi-Volatile Organic Compounds - 100 meter location

	155mm p	propelling charge DODK	155mm propelling charge M3 (zone 3), M284 cannon DODIC: D540	4 cannon	No. of rounds (I) release duration (t):	7	rounds seconds
·	eN	Net Explosive Weight (NEW) in Ibs. Number of Items = 1 SF6 Leak Rate Dilution Factor	/e Weight (NEW) in Ibs. => Number of Items = 1 ak Rate Difution Factor =>	3.28 0.896	Unit Concentration (UC):	1.608E-04	1.608E-04 (g/m³)/(g/s)
		PANCE HISTORY CONTRACTOR	Polaskar ville	The second secon	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration	Measured Background	Average Adjusted Emission Factor	Average Adjusted Emission Factor	Emitted (grams/item)	Concentration for One Round (grams/m³)	Emission Rate for One Round (g/sec)
	(mg/m ₃)	(mg/m³)	(IDAMEILI) EF	(Ib/Ib NEW)	Σ	CONC	ER,
2,4,5-trichlorophenol	2.572E-03	2.236E-03	QN	QN	QN	QN	QN
2-chloronaphthalene	2.572E-03	2.236E-03	QN	QN	QN	QV	Q.
2-nitroaniline	2.572E-03	2.236E-03	QN	QN	QN	ND	QN
dimethyiphthalate	2.572E-03	2.236E-03	QN	QN	QN	QN	QN
2,6-dinitrotoluene	2.572E-03	2.236E-03	QN	QN	ND	ON	QN
3-nitroaniline	5.144E-03	4.471E-03	QN	QN	QN	QN	QN
2,4-dinitrophenol	5.144E-03	4.471E-03	QN	QN	QN	ND	QN
dibenzofuran	2.572E-03	2.236E-03	QN	QN	GN	ND	ND
2,4-dinitrotoluene	2.572E-03	2.236E-03	QN	QN	QN	QN	QN
4-nitrophenol	5.144E-03	4.471E-03	QN	QN	QN	ND	QN
4-chlorophenyl-phenylether	2.572E-03	2.236E-03	QN	QN	ND	ON	QN
diethylphthalate	2.572E-03	2.236E-03	QN	QN	QN	ND	QN
4-nitroaniline	5.144E-03	4.471E-03	QN	QN	QN	QN	QN
4,6-dinitro-2-methylphenol	5.144E-03	4.471E-03	Q	9	QN	ON	QN
n-nitrosodiphenylamine(1)	2.572E-03	2.236E-03	ON	Q	QN	QN	QN
4-bromophenyl-phenylether	2.572E-03	2.236E-03	Q.	Q.	ND	ND	QN
hexachlorobenzene	2.572E-03	. 2.236E-03	QN	Q.	QN	QN	QN
pentachlorophenol	5.144E-03	4.471E-03	QN	ON	QN	QN	QN
di-n-butylphthalate	2.572E-03	2.236E-03	QN	QN	QN	ON	QN
butylbenzylphthalate	2.572E-03	2.236E-03	QN	QN	QN	QN	QN
bis(2-ethylhexyi)phthalate	1.269E-01	5.813E-02	8.853E-04	2.699E-04	4.015E-01	3.228E-05	2.008E-01
di-n-octylphthalate	2.572E-03	2.236E-03	ND	ND	QN	QN	QN
Footnotes:							

'ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study)
ND = Not Detected

Table B-14: Air Modeling Output Data for Polynuciear Aromatic Hydrocarbons, Dioxins/Furans, Aldehydes, and Acid Gases 100 meter location

	mmccl	propelling charge	155mm propelling charge M3 (20ne 3), M284 cannon	4 cannon	No. of rounds (!)		rounds
		DOD	DODIC: D540		release duration (t):	2	2 seconds
	Ne	Net Explosive Weigh	osive Weight (NEW) in lbs. =>	3.28	Unit Concentration (UC):	1.608E-04	1.608E-04 (g/m³)/(g/s)
				000			
		SPO LEAK RAIE D	Leak rate Dilution Factor = 2	0,030			
	A CONTRACTOR OF THE PARTY OF TH	S. T. S. De Listellie.	The artifule performance with the	2	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (tb/ltem) EF	Average Adjusted Emission Factor (Ib/Ib NEW)	(grams/ltem) (grams/ltem)	(grams/m³)	Emission Kate for One Round (g/sec) ER,
PAHs (TO-13 Method)							
acenaphthylene	5.945E-04	6.260E-06	7.578E-06	2.310E-06	3.437E-03	2.763E-07	1.719E-03
acenaphthene	2.275E-04	9.166E-05	1,750E-06	5.334E-07	7.936E-04	6.381E-08	3.968E-04
fluorene	2.944E-04	8.495E-05	2.698E-06	8.224E-07	1.224E-03	9.838⊑-08	6.118E-04
phenanthrene	5.287E-04	1.453E-04	4.938E-06	1.506E-06	2.240E-03	1.801E-07	1.120E-03
anthracene	6.603E-05	6.707E-06	7.641E-07	2.330E-07	3,466E-04	2.787E-08	1.733E-04
fluoranthene	2,244E-04	2.459E-05	2,573E-06	7.845E-07	1.167E-03	9.384E-08	5.836E-04
pyrene	5.831E-04	2.191E-05	7.229E-06	2.204E-06	3.279E-03	2.636E-07	1.639E-03
benzo(a)anthracene	3.944E-05	2.236E-06	5.081E-07	1.549E-07	2.305E-04	1.853E-08	1.152E-04
chrysene	3.830E-05	2.236E-06	4.933E-07	1.504E-07	2.238E-04	1.799E-08	1.119E-04
benzo(b)fluoranthene	8.890E-05	3.353E-06	1.102E-06	3.360E-07	4.998E-04	4.019E-08	2.499E-04
benzo(k)fluoranthene	7.431E-05	2.459E-06	9.255E-07	2.822E-07	4.198E-04	3.375E-08	2.099E-04
benzo(a)pyrene	1.409E-04	2.906E-06	1.778E-06	5.420E-07	8.063E-04	6.483E-08	4.032E-04
Indeno(1,2,3-cd)pyrene	2.218E-04	7.601E-06	2.759E-06	8.412E-07	1.252E-03	1.006E-07	6.258E-04
dlbenz(a,h)anthracene	8.432E-06	3.130E-06	6.829E-08	2.082E-08	3.098E-05	2.490E-09	1.549E-05
benzo(g,h,i)perylene	5.202E-04	1,185E-05	6.548E-06	1.996E-06	2.970E-03	2.388E-07	1.485E-03
Dioxin/Furan Data							
2378-TCDD	7.755E-10	8.000E-12	9.989E-12	3.045E-12	4.531E-09	3.643E-13	2.265E-09
12378-PECDD	2.710E-10	9.000E-12	Q	Q	ND	ND	QN
123478-HXCDD	4.990E-10	1.050E-11	QN	Q	ND	ND	QN
123678-HXCDD	6.330E-10	1.700E-11	7.935E-12	2.419E-12	3.599E-09	2.894E-13	1.800E-09
123789-HXCDD	2.635E-10	1.550E-11	3.194E-12	9.739E-13	1.449E-09	1.165E-13	7.245E-10
1234678-HPCDD	5.851E-09	2.495E-10	7.215E-11	2.200E-11	3.272E-08	2.631E-12	1.636E-08
ocpp	4.574E-08	1.587E-09	5.687E-10	1.734E-10	2.580E-07	2.074E-11	1.290E-07
2378-TCDF	5.110E-10	1.100E-11	6,440E-12	1.964E-12	2.921E-09	2,349E-13	1.461E-09
12378-PECDF	2.975E-10	1.050E-11	QN	QN	ON	ND	QN
23478-PECDF	2.480E-10	1.550E-11	2.995E-12	9.130E-13	1.358E-09	1.092E-13	6.792E-10
123478-HXCDF	4.410E-10	2.800E-11	5.320E-12	1.622E-12	2.413E-09	1.940E-13	1.206E-09
123678-HXCDF	2.270E-10	1.450E-11	2.737E-12	8.345E-13	1.242E-09	9.982E-14	6.208E-10
123789-HXCDF	2.895E-10	6.000E-12	2	QN N	QN	QN	QN

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Table B-14: Air Modeling Output Data for Polynuclear Aromatic Hydrocarbons, Dioxins/Furans, Aldehydes, and Acid Gases 100 meter location

100 illetel location	101						
	155mm pro	propelling charge	pelling charge M3 (zone 3), M284 cannon	4 cannon	No. of rounds (!)	-	rounds
		DOD	DODIC: D540		release duration (t):	2	2 seconds
	θN	Net Explosive Weight (NEW) in Ibs.	t (NEW) in ibs. =>	3.28	Unit Concentration (UC):	1.608E-04	1.608E-04 (g/m³)/(g/s)
		Number of Items = 1 SF6 Leak Rate Dilution Factor	Number of Items = 1 sk Rate Dilution Factor =>	0.896			
		m vicendifference			Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration	Measured Background	Average Adjusted Emission Factor	Average Adjusted Emission Factor	Emitted (grams/ltem)	Concentration for One Round (grams/m³)	Emission Rate for One Round (g/sec)
	(mg/m³)	(mg/m³)	(io/item) EF	(Ib/Ib NEW)	Σ	CONC	ER,
234678-HXCDF	2.395E-10	1.200E-11	QN	ND.	QN	2	QN
1234678-HPCDF	1.954E-09	7.750E-11	2.416E-11	7.367E-12	1.096E-08	8.812E-13	5.480E-09
1234789-HPCDF	2.900E-10	8.000E-12	QN	QN	QN	QN	ΩN
OCDF	2.410E-09	1.105E-10	2.962E-11	9.030E-12	1,344E-08	1.080E-12	6.718E-09
Aldehydes							
Formaldehyde	1.228E-02	1.228E-02	2	Q	QN	ND	QN
Acetaldehyde	1.802E-02	1.802E-02	2	2	ND	ND	QN
Acetone	3.563E-02	4.751E-02	Q	Q	ON	QN	QN
Acrolein	2.294E-02	2.294E-02	ON	Q	QN	ON	QN
Proprionaldehyde	2.374E-02	2.374E-02	QN	QN	QN	QN	QN
Crotonaldehyde	2.867E-02	2.867E-02	QN	QN	QN .	QN	QN
Butyraldehyde	2.949E-02	2.949E-02	QN	QN	QN	QN	QN
Benzaldehyde	4.340E-02	4.340E-02	QN	QN	QN	QN	QN
Isovaleraldehyde	3.523E-02	3.523E-02	QN	QN	GN	QN	Ð
Valeraldehyde	3.523E-02	3.523E-02	QN	QN	QN	QN	Q
o,m,p-Tolualdehyde	9.828E-02	9.828E-02	9	QN	QN	QN	QN
Hexaldehyde	4.097E-02	4.097E-02	QN ON	QN	QN	QN	QN
2,5-Dimethylbenzaldehyde	4.097E-02	4.097E-02	임	QN	QN	QN	QN
Acid gases							
Hydrogen fluoride	1.400E-01	1.400E-01	QN	QN	QN	QN	QN
Hydrogen chloride	1.300E-01	1.300E-01	ON	ON	QN	ON	QV
Hydrogen bromide	1.400E-01	1.400E-01	QN	QN	QN	QN	QN
Nitric Acid	2.050E-01	2.200E-01	QN	2	ND	ON	QN
Phosphoric acid	1.400E-01	1.400E-01	QN	QN	QN	QN	ND
Sulfuric Acid	2.150E-01	1.400E-01	2.769E-03	8.443E-04	1.256E+00	1.010E-04	6.281E-01
Footnotes:							

Footnotes:
'ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study)
ND = Not Detected

Table B-15: Air Modeling Output Data for Cyanide and Energetics - 100 meter location

	155mm	propelling charge	155mm propelling charge M3 (zone 3), M284 cannon DODIC: D540	4 cannon	No. of rounds (I) release duration (I):	1	1 rounds 2 seconds
	S.	Net Explosive Weight	losive Weight (NEW) in lbs. =>	3,28	Unit Concentration (UC):	1.608E-04	1.608E-04 (q/m³)/(q/s)
				0.896			
	The Control of the Co	AND WELLIAM TO A SHEET OF	ELECTION OF THE	The state of the s	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration	Measured Background Concentration	Average Adjusted Emission Factor (lb/Item)	Average Adjusted Emission Factor (Ih/lh NEW)	Emitted (grams/Item)	Concentration for One Round (grams/m³)	Emission Kate for One Round (g/sec)
	(mg/m)	(mg/m³)	H.	(100)	M	CONC	ER,
Particulate Cyanide and HCN				•			
Particulate Cyanide	8,000E-02	8.000E-02	QN	QN	QN	ND	ON
Hydrogen Cyanide	1.350E+00	8.500E-02	1.739E-02	5.302E-03	7.888E+00	6.342E-04	3.944E+00
Energetics Data							
Nitrobenzene	4.704E-01	2.031E-01	Q	2	QN	Q.	2
2-Nitrotoluene	4.704E-01	2.031E-01	QN	QN	QN	2	9
3-Nitrotoluene	4.704E-01	2.031E-01	QN	QN	ND	ND	QN.
4-Nitrotoluene	4.704E-01	2.031E-01	ON	QN	QN	ND	QN
Nitroglycerine	4.704E-01	2.031E-01	QN	QN	QN	QN	QN
1,3-Dinitrobenzene	4.704E-01	2.031E-01	QN	ND	ND	NO NO	2
2,6-Dinitrotoluene	4.704E-01	2.031E-01	ND	QN	QN	QN	ON
2,4-Dinitrotoluene	4.704E-01	2.031E-01	QN	QN	QN	Q	Q
1,3,5-Trinitrobenzene	4.704E-01	2.031E-01	2	QN	QN	QN ON	9
2,4,6-Trinitrotoluene	4.704E-01	2.031E-01	QN	Q	QN	2	Q
RDX	4.704E-01	2.031E-01	Q	Q	QN	QN	9
4-Amino-2,6-Dinitrotoluene	4.704E-01	2.031E-01	QN	Q	QN	Q	2
2-Amino-4,6-Dinitrotoluene	4.704E-01	2.031E-01	QN	QN	ND	QN	QN
Tetryl	4.704E-01	2.031E-01	QN	QN	QN	Q	S
HMX	9.408E-01	4.062E-01	QN	QN	ND	ND	QN
Pentaerythritoltetranitrate	9.408E-01	4.062E-01	QN	2	QN	Q	Q
Dibutyi phthalate	2.352E+01	1.016E+01	QN	QN	ON	QN	QN
Dioctyl phthalate	2.352E+01	1.016E+01	QN	QN	QN	Q.	QN
Diphenylamine	1.176E+01	5.078E+00	QN	ON.	ND	ND	QN

Footnotes:

'ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study)
ND = Not Detected

AIR MODELING OUTPUT DATA FOR CHARGE M3, FIRED FROM THE M284 CANNON, ZONE 3, 200 METERS DOWNWIND

Table B-16: Air Modeling Output Data for Gases, Metals, and Particulates - 200 meter location

	EECT.	propelling charge	155mm propelling cnarge m3 (zone 3), Mz84 cannon DODIC: D540	4 cannon	No. of rounds (t) release duration (t):	- 4	rounds
	Ž	Net Explosive Weight (NEW) in lbs. Number of Items = 1	•	3.28	Unit Concentration (UC):	6.914E-05	6.914E-05 (g/m³)/(g/s)
		SF6 Leak Rate Dilution Factor	Ollution Factor =>	0.896			
		Sile Matrice.	STANDARD AND STANDARD		Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (lb/item) EF	Average Adjusted Emission Factor (Ib/Ib NEW)	(grams/lem) (grams/lem) M	Concentration for One Round (grams/m³)	Emission Kate for One Round (g/sec) ER ₁
Gases							
NH3	3.780E+00	NA	4.363E-02	1.330E-02	1.979E+01	3.420E-04	4.947E+00
CO2	6.480E+01	Ą	7.479E-01	2.280E-01	3.392E+02	5.864E-03	8.481E+01
00	1.679E+02	NA	1.938E+00	5.908E-01	8.790E+02	1.519E-02	2.197E+02
NOx (as NO)	1.353E+00	NA	1.562E-02	4.761E-03	7.083E+00	1.224E-04	1.771E+00
CH4	2.178E+00	NA	QN	QN	QN	Q	Q
802	5.240E-01	NA	QN	QN	QN	QN	2
Combined Particulate							
TSP	4.514E+00	5.300E-02	5.746E-02	1.752E-02	2.606E+01	4.505E-04	6.516E+00
PM10	3.875E+00	4.233E-02	4,937E-02	1.505E-02	2,239E+01	3.871E-04	5.598E+00
PM2.5	2.074E+00	2.400E-02	2.641E-02	8.050E-03	1.198E+01	2.070E-04	2.994E+00
Metals							
Antlmony	1.819E-04	4,345E-06	QN	QN	QN	QN	9
Arsenic	2.814E-04	3.091E-06	3.585E-06	1.093E-06	1.626E-03	2.811E-08	4.066E-04
Barlum	2.814E-03	3.255E-05	3.583E-05	1.092E-05	1.625E-02	2.809E-07	4.063E-03
Beryllium	7.796E-05	1.649E-06	ON	QN	QN	2	QN
Cadmlum	7.796E-05	1.649E-06	QN	QN	ON	ON	9
Chromlum	4.978E-04	7.167E-06	6.320E-06	1.927E-06	2.867E-03	4.955E-08	7.167E-04
Cobalt	8.659E-05	3.763E-06	1.067E-06	3.253E-07	4.839E-04	8.365E-09	1.210E-04
Copper	2.598E-01	1.159E-03	3.331E-03	1.016E-03	1.511E+00	2.612E-05	3.778E-01
Lead	2.381E-02	6.770E-05	3.059E-04	9.325E-05	1.387E-01	2,398E-06	3.468E-02
Manganese	1.992E-03	3.086E-05	2.526E-05	7.700E-06	1.146E-02	1.980E-07	2.864E-03
Nickel	8.659E-04	1.433E-05	1.097E-05	3,344E-06	4.975E-03	8.600E-08	1.244E-03
Selenium	2.599E-04	5.497E-06	QN	QN	GN	QN	QN
Silver	5.197E-05	1.099E-06	Q	QN	QN	ON	QN
Thallium	7.796E-05	1.613E-06	QN	QN	GN	Q.	QN
Zinc	4.544E-02	1.445E-04	5.835E-04	1.779E-04	2.647E-01	4.575E-06	6,617E-02
Footnotes:	ŅĒ.						

'ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study) ND = Not Detected

Table B-17: Air Modeling Output Data for Volatile Organic Compounds - 200 meter location

	155mm nrong	propelling charge	illing charge M3 (zone 3). M284 cannon	4 cannon	No. of rounds (1)	1	rounds
		1000	DODIC: D540		release duration (t):	4	seconds
	Ne	Net Explosive Weigh	osive Weight (NEW) in lbs. =>	3.28	Unit Concentration (UC):	6.914E-05	6.914E-05 (g/m³)/(g/s)
		Number					
			Leak Rate Dilution Factor =>	0.896			
		Strate district	THE TAXABLE PARTY		Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration	Measured Background Concentration	Average Adjusted Emission Factor (tb/Item)	Average Adjusted Emission Factor	(grams/lem)	One Round (grams/m³)	One Round (g/sec)
•	(mg/m)	(mg/m ₃)	n T		W	CONC	ER,
VOCs							
Dichlorodifluoromethane	3.762E-03	3.762E-03	QN	9	QN	QN	2
Methyl Chloride	1.594E-03	1.594E-03	QN	QN	ND	Q	2
Dichlorotetrafluoroethane	4.683E-03	4.683E-03	QN	QN	ND	QN	QN
Vinyl Chloride	5.069E-03	5.069E-03	QN	QN	ND	Q.	Q
1,3-Butadiene	1.790E-03	1.790E-03	QN	QN	ON	S	Q
Methyl Bromide	3.073E-03	3.073E-03	QN	QN	QN	QN	QN
Ethyl Chloride	· 2.112E-03	2.112E-03	QN	QN	QN	Q.	Q
Trichlorofluoromethane	3.934E-03	3.934E-03	QN	Q.	ND	2	S
1,1-Dichloroethene	9.339E-03	6.696E-03	3.405E-05	1.038E-05	1.544E-02	2.669E-07	3.861E-03
Dichloromethane	2.436E-01	5.722E-03	3.064E-03	9.341E-04	1.390E+00	2.402E-05	3.474E-01
3-Chforopropene	2.754E-03	2.754E-03	ON	QN.	QN	ND	. QN
1,1,2-Trichloro-1,2,2-trifluoroethane	5.148E-03	5.750E-03	Q	QN	QN	QN	QN
1,1-Dichloroethane	3.159E-03	3.159E-03	QN	QN	QN	ON	QN
cis-1,2-Dichloroethene	3.295E-03	3.295E-03	QN	QN	QN	ON	QN
Trichloromethane	4.099E-03	4.099E-03	QV	QN	ND	ON	QN
1,2-Dichloroethane	3.443E-03	3.443E-03	QN	QN	ND	ND	QN
1,1,1-Trichloroethane	7.867E-02	1.095E-01	QN	QN	ND	QN Q	2
Benzene	4.807E-02	2.329E-03	6.192E-04	1.888E-04	2.808E-01	4,854E-06	7.021E-02
Carbon Tetrachloride	4.529E-03	4.529E-03	QN	QN	ND	QN	Q
1,2-Dichloropropane	3.419E-03		DN	ON	ND	QN	Q.
Trichloroethene	3.866E-03		QN	ON	ND	GN	QN
cls-1,3-Dichloropropene	3.360E-03		QN	ON	ND	DN	ON
trans-1,3-Dichloropropene	2.860E-03		QN	QN	ND	QN	QN
1,1,2-Trichloroethane	3.877E-03	3.877E-03	ND	ND	NO	QV Q	QN
Toluene	4.247E-03	3.610E-03	8.207E-06	2.502E-06	3.723E-03	6.435E-08	9.307E-04
1,2-Dibromoethane	5.844E-03	5.844E-03	ND	QN	QN	QN	Q.
Tetrachloroethene	4.475E-03	4.475E-03	QV	QN	ND	ND	ND

Table B-17: Air Modeling Output Data for Volatile Organic Compounds - 200 meter location

	155mm prop		elling charge M3 (zone 3), M284 cannon DODIC: D540	4 cannon	No. of rounds (!) release duration (t):	1	1 rounds 4 seconds
	θZ	Net Explosive Weight (NEW) in lbs. Number of Items = 1 SF6 Leak Rate Dilution Factor	/e Weight (NEW) in lbs. => Number of Items = 1 ak Rate Dilution Factor =>	3.28	Unit Concentration (UC):	6.914E-05 (g/m³)/(g/s)	(8/b)/(s/w/b)
	And the second second	S. V. Merical Colors	Destination of the country.	Market Billion of the market	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (lb/item) EF	Average Adjusted Emission Factor (ib/lb NEW)	Emitted (grams/item) M	Concentration for One Round (grams/m³)	Emission Rate for One Round (g/sec) ER,
Chlorobenzene	2.305E-04	2.305E-04	QN	S	S	QN	QN
Ethylbenzene	2.344E-03	2.344E-03	QN	9	ΩN	2	QN.
m&p-Xylene	2.257E-03	2.257E-03	QN	QN	QN	QN QN	QN
Styrene	2.641E-03	2.641E-03	QN	QΝ	QN	QN	QN
1,1,2,2-Tetrachloroethane	4.466E-03	4.466E-03	QN	QN	QN	QN	QN
o-Xylene	2.474E-03	2.474E-03	QN	QN	QN	ND	QN
4-Ethyitoluene	2.214E-03	2.214E-03	QN	QN	QN	ND	QN
1,3,5-Trimethylbenzene	2.460E-03	2.460E-03	QN	QN	QN	ND	QN
1,2,4-Trimethylbenzene	2.312E-03	2.312E-03	QN	QN	QN	ND	QN
Benzyl Chloride	5.076E-03	5.076E-03	ND	ON	QN	ND	QN
m-Dichlorobenzene	3.366E-03	3,366E-03	QN	ON	QN	ND	QN
p-Dichlorobenzene	2.945E-03	2.945E-03	QN	QN	QN	QN	QN
o-Dichlorobenzene	3.606E-03	3.606E-03	QN	QN	QN	QN	QN
1,2,4-Trichlorobenzene	4.526E-03	4,526E-03	QN	QN	QN	QN	QN
Hexachlorobutadiene	4.690E-03	4,690E-03	QN	Q.	, QN	QN	QN
Methane	2.023E+00	1.364E+00	8.488E-03	2.588E-03	3.850€+00	6.655E-05	9.625E-01
Ethane	6.764E-01	6.764E-01	QN	ON	MD	QN	QN
Ethylene	6.310E-01	6.310E-01	ND	QN	QN	QN	ND
Propane	9.920E-01	9.920E-01	ND	DN	QN	ON	ND
Acetylene	5.858E-01	5.858E-01	ND	QN	QN	QN	ON
Isobutane	1.307E+00	1.307E+00	ND	QN	QN	QN	QN
n-Butane	1.307E+00	1.307E+00	QN	QN	QN	QN	ON
Propylene	9.466E-01	9.466E-01	ND	ND	ON	ND	QN
Footnotes:							

Footnotes: |ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study)
|ND = Not Detected

Table B-18; Air Modeling Output Data for Semi-Volatile Organic Compounds - 200 meter location

		DODK	DODIC: D540				
i					release duration (t):	4	seconds
	Ne	Net Explosive Weight	losive Weight (NEW) in lbs. =>	3.28	Unit Concentration (UC):	6.914E-05	6.914E-05 (g/m³)/(g/s)
		Number of SF6 Leak Rate D	Number of Items = 1 Leak Rate Dilution Factor =>	0.896			
		Trestablibilities of	ह्यायः करतीरः क	The state of the s	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (lb/ltem) EF	Average Adjusted Emission Factor (Ib/lb NEW)	(grams/Item)	One Round (grams/m³)	One Round (g/sec) (ER ₁
SVOCS							
n-nitrosodimethylamine	2.572E-03	2.236E-03	QN	Q.	QN	QN	QN
bis(2-chloroethyl)ether	2.572E-03	2.236E-03	QN	QN	QN	QN	QN
phenol	2.058E-02	1.923E-02	1.743E-05	5.314E-06	7.906E-03	1.367E-07	1.977E-03
2-chlorophenol	2.572E-03	2.236E-03	QN	QN	QN	QN	QN
1,3-dichlorobenzene	2.572E-03	2.236E-03	Q	Q.	ΩN	QN	Q
1,4-dichlorobenzene	2.572E-03		ND	QN	ON	QN	QN
1,2-dichlorobenzene	2.572E-03	2.236E-03	ON	QN	ON	QN	QN
benzyl alcohol	2.572E-03	2.236E-03	QN	QN	ND	ND	QN
bis(2-chloroisopropyl)ether	2.572E-03	2.236E-03	QN	QN	ND	QN	QN
2-methylphenol	2.572E-03	2.236E-03	QN	QN	ND	QN	QN
hexachloroethane	2.572E-03	2.236E-03	QN	QN	ND	ND ,	QN
n-nitroso-di-n-propylamine	2.572E-03	2.236E-03	QN .	QN	QN	QN	QN
4-methylphenol	2.572E-03		QN	QN	QN	QN	QN
nitrobenzene	2.572E-03		QN	QN	QN	QN	QN
Isophorone	2.572E-03		DN	QN	QN	QN	QN
2-nitrophenol	2.572E-03		Q	QN	QN	Q	Q
2,4-dimethylphenol	2.572E-03		Q	Q	QN	Q	Q
bis(2-chloroethoxy)methane	2.572E-03	2.236E-03	QN	Q	QN	2	QN
2,4-dichlorophenol	2.572E-03		ND	QN	QN	QN	QN
1,2,4-trichlorobenzene	2.572E-03	2.236E-03	QN	ON	QN	QN	ND
naphthalene	3.659E-03	2.236E-03	4.713E-05	1.437E-05	2.138E-02	3.695E-07	5.344E-03
4-chloroaniline	2.572E-02	2.236E-02	ON	QN	QN	QN	ΩN
hexachlorobutadiene	2.572E-03	2.236E-03	QN	QN	ND	ON	QN
4-chloro-3-methylphenol	2.572E-03		QN	Q N	QN	QN	Q
2-methylnaphthalene	2.572E-03	2.236E-03	QN	QN	ON	QV	QN
hexachiorocyclopentadlene	2.572E-03	2.236E-03	Q	Q	QN	Q	Q
2,4,6-trichlorophenol	2.572E-03	2.236E-03	QN	QN	QN	QN	Q.

Table B-18: Air Modeling Output Data for Semi-Volatile Organic Compounds - 200 meter location

	155mm	propelling charge	155mm propelling charge M3 (zone 3), M284 cannon	4 cannon	No. of rounds (I)		rounds
		naoa	DODIC: D540		release duration (t):	4	4 seconds
	Ne	Net Explosive Weight (NEW) in Ibs.	t (NEW) in ibs. =>	3.28	Unit Concentration (UC):	6.914E-05	6.914E-05 (g/m³)/(g/s)
		Number of Items = 1 SF6 Leak Rate Dilution Factor	Number of Items = 1 k Rate Dilution Factor =>	0.896			
		A KNOTHOW			Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual	Measured	Average Adjusted	Average Adjusted	Emitted (grams/ltem)	Concentration for One Round	Emission Rate for One Round
	Concentration (mg/m³)	Concentration (mg/m³)	(lb/ltem)	Emission Factor (Ib/Ib NEW)	Σ	(grams/m³) CONC	(g/sec) ER ₁
2,4,5-trichlorophenol	2.572E-03	2.236E-03	QN.	QN	QN	QN	QN
2-chtoronaphthatene	2.572E-03	2.236E-03	Q	QN	QN	Q	QN
2-nitroaniline	2.572E-03	2.236E-03	QN	QN	ON	QN	QN
dimethylphthalate	2.572E-03	2.236E-03	QN	QN	ON	ND	QN
2,6-dinitrotoluene	2.572E-03	2.236E-03	S	QN	ON	QN	QN
3-nitroaniline	5.144E-03	4.471E-03	QN	QN	QN	QN	QN
2,4-dinitrophenol	5.144E-03	4.471E-03	ON	QN	QN	QN	QN
dibenzofuran	2.572E-03	2.236E-03	QN	QN	QN	ND	QN
2,4-dinitrotoluene	2.572E-03	2.236E-03	ON.	QN	ON	QN	QN
4-nitrophenol	5.144E-03	4.471E-03	Q	QN	ND	QN	QN
4-chlorophenyl-phenylether	2.572E-03	2.236E-03	QN	QN	QN	ND	QN
diethylphthalate	2.572E-03	2.236E-03	QN	QN	ON	QN	QN
4-nitroanlline	5.144E-03	4.471E-03	ON	QN	QN	ND	QN
4,6-dinitro-2-methylphenol	5.144E-03	4,471E-03	QN	QN	ON	QN	QN
n-nitrosodiphenylamine(1)	2.572E-03	2.236E-03	QN	QN	QN	ND	QN
4-bromophenyl-phenylether	2.572E-03	2.236E-03	QN	QN	QN	ON	QN
hexachlorobenzene	2.572E-03	2.236E-03	ON .	QN	QN	ON	QN
pentachlorophenol	5,144E-03	4.471E-03	QN	QN	QN	2	QN
di-n-butylphthalate	2.572E-03	2.236E-03	QN	QN	QN	QN	QN
butylbenzylphthalate	2.572E-03	2.236E-03	QN	QN	UD	QN	QN
bis(2-ethylhexyl)phthalate	1.269E-01	5.813E-02	8.853E-04	2.699E-04	4.015E-01	6.941E-06	1.004E-01
di-n-octyiphthalate	2.572E-03	2.236E-03	ND	QN	ND	ON	QN
Footnotes:							

reconnotes: ¹ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study) ND = Not Detected

Table B-19: Air Modeling Output Data for Polynuclear Aromatic Hydrocarbons, Dioxins/Furans, Aldehydes, and Acid Gases 200 meter location

		sprado sufflorior	and 18 mm and the second of the second and s	d cannon	(I) aballot jo oN	-	rollade
			DODIC: D540		release duration (t):	4	seconds
		1		00.0	Concentration of all the	מט שואם ט	(-1-3)/(-1-)
	lev.	Net Explosive Weight (NEW) in lbs.	t (NEW) in ibs. =>	3.28	Onit Concentration (OC):	0.9146-00	o.914E-U3 (g/m²)/(g/s)
		SF6 Leak Rate D	Leak Rate Dilution Factor =>	0.896			
		्रभरव्यमाहिः	भरत्यनात्रीहरू में किस्तानाहरू	Barrell Commence of the Commen	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (Ib/Item) EF	Average Adjusted Emission Factor (tb/lb NEW)	Emitted (grams/item) M	Concentration for One Round (grams/m³)	Emission Rate for One Round (g/sec) ER,
PAHs (TO-13 Method)							
acenaphthylene	5.945E-04	6.260E-06	7.578E-06	2.310E-06	3,437E-03	5.941E-08	8.593E-04
acenaphthene	2.275E-04	9.166E-05	1.750E-06	5.334E-07	7.936E-04	1.372E-08	1.984E-04
fluorene	2.944E-04	8.495E-05	2.698E-06	8.224E-07	1.224E-03	2.115E-08	3,059E-04
phenanthrene	5.287E-04	1.453E-04	4.938E-06	1.506E-06	2,240E-03	3.872E-08	5,600E-04
anthracene	6.603E-05	6.707E-06	7.641E-07	2.330E-07	3.466E-04	5.991E-09	8.665E-05
fluoranthene	2.244E-04	2.459E-05	2.573E-06	7.845E-07	1.167E-03	2.018E-08	2.918E-04
pyrene	5.831E-04	2.191E-05	7.229E-06	2.204E-06	3.279E-03	5.667E-08	8.197E-04
benzo(a)anthracene	3.944E-05	2.236E-06	5.081E-07	1.549E-07	2.305E-04	3.983E-09	5.761E-05
chrysene	3.830E-05	2.236E-06	4.933E-07	1.504E-07	2.238E-04	3.868E-09	5.594E-05
benzo(b)fluoranthene	8.890E-05	3.353E-06	1.102E-06	3.360E-07	4.998E-04	8.640E-09	1.250E-04
benzo(k)fluoranthene	7.431E-05	2.459E-06	9.255E-07	2.822E-07	4.198E-04	7.256E-09	1.049E-04
benzo(a)pyrene	1.409E-04	2.906E-06	1.778E-06	5.420E-07	8.063E-04	1.394E-08	2.016E-04
Indeno(1,2,3-cd)pyrene	2,218E-04	7.601E-06	2.759E-06	8.412E-07	1.252E-03	2.163E-08	3.129E-04
dibenz(a,h)anthracene	8.432E-06	3.130E-06	6.829E-08	2.082E-08	3.098E-05	5.354E-10	7.744E-06
benzo(g,h,l)perylene	5.202E-04	1.185E-05	6.548E-08	1.996E-06	2,970E-03	5,134E-08	7,425E-04
Dioxin/Furan Data							
2378-TCDD	7.755E-10	8.000E-12	9.989E-12	3.045E-12	4.531E-09	7.832E-14	1.133E-09
12378-PECDD	2.710E-10	9.000E-12		2 2	2 2	2 2	2 2
123478-HACOD	4.990E-10	1.030E-11	7 035E-12	2 419E-12	3 500F.00	R 221E.14	R CORE 10
ACONT-01200	0,000E-10	4 EEOE 44	2 404E 42	0 7305 43	4 4405.00	2 FORE 14	2 622E 40
1237 03-11ACDD	5.854E-00	2 495F-10	7.215F-11	2 200E-11	3 272F-08	5 656F-13	8 1815-09
220 11-21-21-21	4 574E-08		5 687E-10	1 734F-10	2 580F-07	4 459F-12	6.449F-08
2278-TCDE	5 110E-10		6.440F-12	1 964F-12	2.921E-09	5.049E-14	7.303E-10
12378-PECDF	2,975E-10	1.050E-11	QN	QN	QN	QN	Q
23478-PECDF	2.480E-10	1.550E-11	2.995E-12	9.130E-13	1.358E-09	2.348E-14	3,396E-10
123478-HXCDF	4.410E-10	2.800E-11	5.320E-12	1.622E-12	2.413E-09	4.171E-14	6.032E-10
123678-HXCDF	2.270E-10	1.450E-11	2.737E-12	8.345E-13	1.242E-09	2.146E-14	3.104E-10
123789-HXCDF	2.895E-10	6.000E-12	QN	Q	QN	QN	QN

Table B-19: Air Modeling Output Data for Polynuclear Aromatic Hydrocarbons, Dioxins/Furans, Aldehydes, and Acid Gases 200 meter location

בטט ווופנפו וטכמנוטוו							
	155mm prop	propelling charge	oelling charge M3 (zone 3), M284 cannon	4 cannon	No. of rounds (I)	-	rounds
		DOD	DODIC: D540		release duration (t):	4	seconds
	Ne	Net Explosive Weight (NEW) in Ibs.	t (NEW) in lbs. =>	3.28	Unit Concentration (UC):	6.914E-05	6.914E-05 (g/m³)/(g/s)
		Number of Items = 1 SF6 Leak Rate Dilution Factor	Number of Items = 1 ak Rate Dilution Factor =>	0.896			
	L. Works	Marketon de la	M. Drift on P.		Total Mass of Substance	Average Modeled	Substance
	Measured Actual	Measured	Average Adjusted	Average Adjusted	Emitted (grams/item)	Concentration for One Round	Emission Rate for One Round
	Concentration (mg/m³)	Background Concentration (mg/m³)	Emission Factor (lb//tem) EF	Emission Factor (Ib/Ib NEW)	Σ	(grams/m³)	(g/sec) ER,
# 50 XIII 0 F0 100	27.200	77 1000 7	2	2		GIA	
2346/8-HXCDF	2.395E-10	1.200E-11	ND 2446F 44	ND.	ND 1 000E 00	ND 4	ON COLOR
12346/8-HPCUF	1.904E-09	7.750E-11	2.4.10E-11	1,30/E-12	1.096E-06	1.885E-13	Z./40E-09
OCDF	2.300E-10	1.105E-10	2.962E-11	9.030E-12	1.344E-08	2.322E-13	3.359E-09
Aldehydes							
Formaldehyde	1.228E-02	1.228E-02	QN	Q	QN	QN	QN
Acetaldehyde	1.802E-02	1.802E-02	QN	QN	QN	QN	Q
Acetone	3.563E-02	4.751E-02	QN	QN	QN	DN	QN
Acrolein	2.294E-02	2.294E-02	QN	QN	QN	QN	QN
Proprionaldehyde	2.374E-02	2.374E-02	ON	QN	QN	QN	QN
Crotonaldehyde	2.867E-02	2.867E-02	QN	QN	QN	QN	QN
Butyraldehyde	2.949E-02	2.949E-02	QN	QN	QN	QN	QN
Benzaldehyde	4.340E-02	4.340E-02	QN	QN	QN	QN	ND
Isovaleraldehyde	3.523E-02	3.523E-02	QN	QN	QN	QN	QN
Valeraldehyde	3.523E-02	3.523E-02	QN	QN	QN	QN	QN
o,m,p-Tolualdehyde	9.828E-02	9.828E-02	ND	QN	ON	QN	QN
Hexaldehyde	4.097E-02	4.097E-02	ND	Q	ND	QN	QN
2,5-Dimethylbenzaldehyde	4.097E-02	4.097E-02	QN	QN	QN	QN	QN
Acid gases							
Hydrogen fluoride	1,400E-01	1.400E-01	QN	QN	ND	QN	QN
Hydrogen chloride	1.300E-01	1.300E-01	QN	ND	ND	QN	QN
Hydrogen bromide	1.400E-01	1.400E-01	Q.	QN	ND	QN	QN
Nitric Acid	2.050E-01	2.200E-01	ND	QN	ND	QN	ON
Phosphoric acid	1.400E-01	1,400E-01	Q	2	ND	Q	QN
Sulfuric Acid	2.150E-01	1.400E-01	2.769E-03	8.443E-04	1.256E+00	2.171E-05	3.140E-01
Footnotes:							

'ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study) ND = Not Detected

Table B-20: Air Modeling Output Data for Cyanide and Energetics - 200 meter location

	155mm	propelling charge DODI	155mm propelling charge M3 (zone 3), M284 cannon DODIC: D540	4 cannon	No. of rounds (I) release duration (t):	4	rounds seconds
	e N	Net Explosive Weigh Number o SF6 Leak Rate D	losive Weight (NEW) in lbs. => Number of Items = 1 Leak Rate Dilution Factor. =>	3.28	Unit Concentration (UC):	6.914E-05	6.914E-05 (g/m³)/(g/s)
	A CONTRACTOR OF THE PARTY OF TH	SACTIONS	SACHULLUS LIKETHE	The second second canality in the second second	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (Ib/Item) EF	Average Adjusted Emission Factor (ib/ib NEW)	Emitted (grams/Item) M	Concentration for One Round (grams/m³)	Emission kate for One Round (g/sec) ER ₁
Particulate Cyanide and HCN							
Particulate Cyanide	8.000E-02	8.000E-02	QN	QN	QN	ON	QN
Hydrogen Cyanide	1.350E+00	8.500E-02	1.739E-02	5.302E-03	7.888E+00	1.363E-04	1.972E+00
Energetics Data							
Nitrobenzene	4.704E-01	2.031E-01	QN	Q	QN	Q	Q
2-Nitrotoluene	4.704E-01	2.031E-01	ND	2	QN	Q	QN
3-Nitrotoluene	4.704E-01	2.031E-01	QN	ON	ND	2	SO
4-Nitrotoluene	4.704E-01	2.031E-01	QN	QN	QN	QN	Q
Nitroglycerine	4.704E-01	2.031E-01	QN	Q	QN	Q	2
1,3-Dinitrobenzene	4.704E-01	2.031E-01	QN	2	QN	QN	QN
2,6-Dinitrotoluene	4.704E-01	2.031E-01	QN	Q	QN	QN	QV
2,4-Dinitrotoluene	4.704E-01	2.031E-01	QN	Q	QN	Q	Q
1,3,5-Trinltrobenzene	4.704E-01	2.031E-01	Q	Q	QN	Q	Q
2,4,6-Trinitrotoluene	4.704E-01	2.031E-01	QN	QN	QN	Q	Q
RDX	4.704E-01	2.031E-01	Q	QN	QN	QN	Q
4-Amino-2,6-Dinitrotoluene	4.704E-01	2.031E-01	ND	S	QN	Q	2
2-Amino-4,6-Dinitrotoluene	4.704E-01	2.031E-01	QN	QN	ND	Q	Q.
Tetryl	4.704E-01	2.031E-01	ND	ND	QN	Q	S
HMX	9.408E-01	4.062E-01	ND	QN	QN	Q	Q
Pentaerythritoltetranitrate	9.408E-01	4.062E-01	QN	QN	QN	QN	QN
Dibutyl phthalate	2.352E+01	1.016E+01	ND	QN	QN	QN	2
Dioctyl phthalate	2.352E+01	1.016E+01	QN	QN	QN	QV	Q
Diphenylamine	1.176E+01	5.078E+00	ND	ND	ON	QN	ND
T 4 4 T							

Footnotes:

'ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study)
ND = Not Detected

AIR MODELING OUTPUT DATA FOR CHARGE M3, FIRED FROM THE M199 CANNON, ZONE 5, 100 METERS DOWNWIND

Table B-21: Air Modeling Output Data for Gases, Metals, and Particulates - 100 meter location

	155mm prop	propelling charge	elling charge M3 (zone 5), M199 cannon	9 cannon	No. of rounds (I)		rounds
		DOD	DODIC: D540		release duration (t):	2	seconds
	Ne	Net Explosive Weight (NEW) In Ibs.	t (NEW) in ibs. =>	5.94	Unit Concentration (UC):	1.455E-04	1.455E-04 (g/m³)/(g/s)
		Number of Items = 1 SF6 Leak Rate Dilution Factor	Number of Items = 1 ak Rate Dilution Factor =>	0.95			
			Selection to selection of	10 m	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emlssion Factor (lb/ltem) EF	Average Adjusted Emission Factor (lb/lb NEW)	Emitted (grams/item)	Concentration for One Round (grams/m³) CONC	Emission Rate for One Round (g/sec) ER,
Gases							
NH3	8.400E+00	NA	9.695E-02	1.632E-02	4.397E+01	3 199F-03	2 100E±01
CO2	1.080E+02	NA	1.246E+00	2.098E-01	5.654E+02	4.113E-02	2.827E+02
00	2.841E+02	NA	3.278E+00	5.519E-01	1.487E+03	1.082E-01	7.435E+02
NOx (as NO)	3.936E+00	NA	4.543E-02	7.647E-03	2.060E+01	1.499E-03	1,030E+01
CH4	2.178E+00	A'A	QN	QN	QN	QN	QN
502	5.240E-01	NA A	Q	QN	QN	QN	QN
Combined Particulate							
TSP	1.122E+01	5.300E-02	1.356E-01	2.284E-02	6.153E+01	4.476E-03	3.076E+01
PM10	8.017E+00	4.233E-02	9.688E-02	1.631E-02	4.394E+01	3.197E-03	2.197E+01
PM2.5	3.180E+00	2.400E-02	3.834E-02	6.455E-03	1.739E+01	1.265E-03	8.696E+00
Metals							
Antimony	2.819E-04	4.345E-06	3.371E-06	5.676E-07	1.529E-03	1.113E-07	7.646E-04
Arsenic	6.180E-04	3.091E-06	7.470E-06	1.258E-06	3.388E-03	2.465E-07	1.694E-03
Barlum	6.071E-03	3.255E-05	7.336E-05	1.235E-05	3.327E-02	2.421E-06	1.664E-02
Beryllium	7.806E-05	1.649E-06	Q	QN	QN	QN	QN
Cadmium	2.103E-04	1.649E-06	2.555E-06	4.301E-07	1,159E-03	8.431E-08	5.795E-04
Chromium	1.334E-03	7.167E-06	1.611E-05	2.713E-06	7.309E-03	5.317E-07	3.654E-03
Coball	1.713E-04	3.763E-06	2,035E-06	3.426E-07	9.231E-04	6,716E-08	4.616E-04
indica	1.518E+00	1.159E-03	1.842E-02	3.102E-03	8.357E+00	6.080E-04	4.179E+00
Lead	3.036E-02	6.770E-05	3.680E-04	6.195E-05	1.669E-01	1.214E-05	8.345E-02
wanganese	7.480E-03	3.086E-05	9.050E-05	1.524E-05	4.105E-02	2.986E-06	2.053E-02
Nickel	2.494E-03	1.433E-05	3.012E-05	5.071E-06	1.366E-02	9.939E-07	6.831E-03
Selenium	2.602E-04	5.497E-06	2	Q	QN	QN	QN
Silver	1.019E-04	1.099E-06	1.238E-06	2.084E-07	5.615E-04	4.085E-08	2.808E-04
Inamum	7.806E-05	1.613E-06	2	QN	QN	QN ON	S
ZING	2.385E-01	1.445E-04	2.896E-03	4.875E-04	1.314E+00	9.556E-05	6.568E-01
Footnotes:	÷						

'ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study) ND = Not Detected

	155mm propel	ropelling charge	Ilna charge M3 (zone 5), M199 cannon	9 cannon	No. of rounds (!)		rounds
		Idod	DODIC: D540		release duration (t):	2	2 seconds
	Nei	Net Explosive Weigh	sive Weight (NEW) in lbs. =>	5.94	Unit Concentration (UC):	1.455E-04	1.455E-04 (g/m³)/(g/s)
			Number of Items = 1	0			
		SP6 Leak Rate L	Lactor	CO'O			
		Ten. Hiller and	i Sugaria.	The state of the s	Total Mass of Substance	Average Modeled	Substance Emission Rate for
Compound	Measured Actual Concentration	Measured	Average Adjusted Emission Factor	Average Adjusted Emission Factor	(grams/ltem)	One Round (grams/m³)	One Round (g/sec)
	(mg/m³)	(mg/m³)	(ionem) EF	(Ib/Ib NEW)	M	CONC	ER,
VOCs							
Dichlorodifluoromethane	3.762E-03	3.762E-03	QV	S	QN	Q	QN
Methyl Chloride	1.594E-03	1.594E-03	2	QN	QN	임	Q.
Dichlorotetrafluoroethane	4.683E-03	4.683E-03	S	QN	ON	QN	Q
Vinyl Chloride	5.069E-03	5.069E-03	QN	QN	ND	QN	Q
1.3-Butadiene	1.790E-03	1.790E-03	QN	Q	QN	QN	2
Methyl Bromlde	3.073E-03	3.073E-03	QN	QN	QN	QN	Q
Ethyl Chloride	2.112E-03	2.112E-03	QN	Q	QN	Q	QN
Trichlorofluoromethane	3.934E-03	3.934E-03	QN	Q	QN	QN	QN
1,1-Dichloroethene	9.184E-03	6.696E-03	3.023E-05	5.090E-06	1.371E-02	9.977E-07	6.857E-03
Dichloromethane	1.519E-01	5.722E-03	1.776E-03	2.989E-04	8.054E-01	5.860E-05	4.027E-01
3-Chloropropene	2.754E-03	2.754E-03	QN	QN	QN	QN	Q
1.1.2-Trichloro-1,2,2-trifluoroethane	4.752E-03	5,750E-03	QN	Q	QN	Q	2
1.1-Dichloroethane	3.159E-03	3.159E-03	QN	QN	ND	QN	Q
cls-1,2-Dichloroethene	3.295E-03	3.295E-03	NO NO	QN	ON	QN	2
Trichloromethane	4.099E-03	4,099E-03	9	Q	QN	Q	Q !
1,2-Dichloroethane	3.443E-03	3.443E-03	Q	Q	QN	2	ON S
1,1,1-Trichloroethane	2.070E-02	1.095E-01	Q.	2	ON	ON	ON COST
Benzene	7.375E-02	2.329E-03	8.959E-04	1.508E-04	4.064E-01	2.956E-05	2.032E-01
Carbon Tetrachloride	4.529E-03	4.529E-03	Q.	Q.	2	2 2	ON CA
1,2-Dichtoropropane	3.419E-03	3.419E-03	ON.	O. I	2	2 2	2 2
Trichtoroethene	3.866E-03	3.866E-03	2	QN	ON	QN.	
cis-1,3-Dichloropropene	3.360E-03	3,360E-03	Ð	Q	QN	2	Q
trans-1,3-Dichloropropene	2.860E-03	2.860E-03	QN	Q	QN	Q.	QN
1,1,2-Trichloroethane	3.877E-03	3.877E-03	ON	QN	QN	2	Q
Toluene	5.655E-03	3.610E-03	2.485E-05	4.183E-06	1.127E-02	8.199E-07	5.635E-03
1,2-Dibromoethane	5.844E-03	5.844E-03	Q	Q	QN	QN:	Q.
Tetrachloroethene	4.475E-03	4,475E-03	Q	QN	QN	QN	QN

Table B-22: Air Modeling Output Data for Volatile Organic Compounds - 100 meter location

	155mm	oropelling charge DODI	155mm propelling charge M3 (zone 5), M199 cannon DODIC: D540	9 cannon	No. of rounds (I) release duration (t):	1 2	1 rounds 2 seconds
	Ö.	Net Explosive Weight (NEW) in lbs. Number of Items = 1		5.94	Unit Concentration (UC):	1.455E-04	1.455E-04 (g/m³)/(g/s)
		SF6 Leak Rate Dilution Factor	ilution Factor =>	0.95			
		ीर जार विद्याल है।	Kelkster offer		Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual	Measured Background	Average Adjusted Emission Factor	Average Adjusted	Emitted (grams/item)	Concentration for One Round (grams/m³)	Emission Rate for One Round (q/sec)
	(mg/m³)	Concentration (mg/m³)	(lb/ltem) EF	(Ib/Ib NEW)	Σ	CONC	ER,
Chlorobenzene	2.305E-04	2.305E-04	QN	QN	QN	QV	QN ON
Ethylbenzene	2.344E-03	2.344E-03	QN	QN	QN	QN	QN
m&p-Xylene	2.257E-03	2.257E-03	QN	QN	QN	QN	QN
Styrene	2.641E-03	2.641E-03	QN	QN	QN	QN	Q
1,1,2,2-Tetrachloroethane	4.466E-03	4.466E-03	QN	QN	QN ·	ND	QN
o-Xylene	2.474E-03	2.474E-03	Q	QN	ON	ND	QN
4-Ethyltoluene	2.214E-03	2.214E-03	Q	S	ND	DN	QN
1,3,5-Trimethylbenzene	2.460E-03	2.460E-03	QN	QN	ON	QN	QN
1,2,4-Trimethylbenzene	2.312E-03	2.312E-03	ON	QN	QN	QN ON	Q
Benzyl Chloride	5.076E-03	5.076E-03	QN	QN	ON	ON	QN
m-Dichlorobenzene	3.366E-03	3.366E-03	2	QN	QN	QN	QN
p-Dichlorobenzene	2.945E-03	2.945E-03	QN	QN	QN	QN	QN
o-Dichlorobenzene	3.606E-03	3.606E-03	ON	QN	QN	QN	Q.
1,2,4-Trichlorobenzene	4.526E-03	4.526E-03	<u>Q</u>	Q	QN	ND	ON.
Hexachlorobutadlene	4.690E-03	4.690E-03	ᄝ	QN	QN	QN	QN
Methane	3.094E+00	1.364E+00	2.102E-02	3.539E-03	9.534E+00	6.936E-04	4.767E+00
Ethane	6.764E-01	6.764E-01	QN	QN	. ON	QN	Q
Ethylene	6.310E-01	6.310E-01	QN	QN	QN	ON	QN
Propane	9.920E-01	9.920E-01	QN	QN	ON	Q.	Q
Acetylene	5.858E-01	5.858E-01	ON	QN	ON	ND	QN
Isobutane	1.307E+00	1.307E+00	ON	Q	ON	ND	QV
n-Butane	1,307E+00	1.307E+00	QN	QN	DN	QN	QN
Propylene	9.466E-01	9.466E-01	ND	ND	ND	ND	QN
Footnotes:							

Table B-23; Air Modeling Output Data for Semi-Volatile Organic Compounds - 100 meter location

	155mm	propelling charge	155mm propelling charge M3 (zone 5), M199 cannon	9 cannon	No. of rounds (I)	1	rounds
		Idod	DODIC: D540		release duration (t):	2	seconds
	9N	Net Explosive Weight (NEW) in lbs.	t (NEW) in lbs. =>	5.94	Unit Concentration (UC):	1,455E-04	1.455E-04 (g/m³)/(g/s)
		Number of SF6 Leak Rate D	Number of Items = 1 Leak Rate Dilution Factor =>	0.95			2
		Tompie oxive sign	ACHIER PRODUCE	The second secon	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (ib/item) EF	Average Adjusted Emission Factor (lb/lb NEW)	Emitted (grams/item) M	Concentration for One Round (grams/m³) CONC	Emission Rate for One Round (g/sec) ER,
SVOCs							
n-nitrosodimethylamine	2.577E-03	5.605E-05	QN	QN	QN	QN	QN
bis(2-chloroethyl)ether	2.577E-03	5.605E-05	. QN	QN	QN	QN	QN
phenol	1.025E-02	7.120E-03	3.806E-05	6.407E-06	1.726E-02	1.256E-06	8.632E-03
2-chlorophenol	2.577E-03	5.605E-05	QN	QN	QN	QN	QN
1,3-dichlorobenzene	2.577E-03	5.605E-05	QN	QN	ND	QN	QN
1,4-dichlorobenzene	2.577E-03	5.664E-05	QN	QN	ON	QN	QN
1,2-dichlorobenzene	2.577E-03	5.605E-05	QN	ON	ON	QN	QN
benzyl alcohol	2.577E-03	5.605E-05	QN	QN ND	QN	QN	QN
bis(2-chlorolsopropyl)ether	2.577E-03	5.605E-05	QN	ΩN	ON	QN	QN
2-methylphenol	2.577E-03	5.605E-05	Q	8	ND	ON	QN
hexachloroethane	2.577E-03	5.605E-05	QN	QN	ND	QN	QN
n-nitroso-dl-n-propylamine	2.577E-03	5.605E-05	QN	QN	QN	QN	QN
4-methylphenol	2.577E-03	5.605E-05	QN	QN	QN	QN	QN
nitrobenzene	2.577E-03	5.605E-05	QN	QN	ND	QN	QN
Isophorone	2.577E-03	5.605E-05	QN	QN	QN	QN	QN
2-nitrophenol	2.577E-03	3.660E-04	Q	QN	QN	QN	QN
2,4-dimethylphenol	2.577E-03	5.605E-05	2	2	ND	QN	QN
bis(2-chloroethoxy)methane	2.577E-03	5.605E-05	۵N	QN	QN	QN	QN
2,4-dichlorophenol	2.577E-03	5.605E-05	Q	ΩN	ND	DN	QN
1,2,4-trichlorobenzene	2.577E-03	5.605E-05	Q	ΩN	ND	ON	QN
naphthalene	2.205E-03	1.366E-04	2.513E-05	4.231E-08	1.140E-02	8,293E-07	5.699E-03
4-chloroaniline	2.577E-02	5.605E-04	QN	QN	ON	QN	QN
hexachlorobutadiene	2.577E-03	5.605E-05	QN	QN	QN	QN	QN
4-chloro-3-methylphenol	2.577E-03	5.605E-05	Q	QV	ND	QN	QN
2-methylnaphthalene	2.577E-03	1.694E-04	ᄝ	2	ND	ON	QN
hexachlorocyclopentadiene	2.577E-03	5.605E-05	Q	QN	QN	QN	QN
2,4,6-trichlorophenol	2.577E-03	5.605E-05	QN	QN	ND	2	QN

Table B-23: Air Modeling Output Data for Semi-Volatile Organic Compounds - 100 meter location

	155mm prop	propelling charge DODI	elling charge M3 (zone 5), M199 cannon DODIC: D540	9 cannon	No. of rounds (I) release duration (t):	2	1 rounds 2 seconds
	Ne	olosiv 3 Les	/e Weight (NEW) in lbs. => Number of Items = 1 sk Rate Dilution Factor =>	5.94 0.95	Unit Concentration (UC):	1.455E-04	1.455E-04 (g/m³)/(g/s)
		POLITICAL STATES	Sed Hulling from the control		Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (Ib/item) EF	Average Adjusted Emission Factor (Ib/lb NEW)	Emitted (grams/item) M	Concentration for One Round (grams/m³)	Emission Rate for One Round (g/sec) ER,
2,4,5-trichlorophenol	2.577E-03	5.605E-05	QN	QN	QN	QN	QN ON
2-chloronaphthalene	2.577E-03	5.605E-05	ΩN	QN	ND	QN	Q
2-nitroanlline	2.577E-03	5.605E-05	QN	QN	QN	ND	QN
dimethylphthalate	2.577E-03	5.605E-05	2	S	ND	ON	QN
2,6-dinitrotoluene	2.577E-03	5.721E-05	Q	Q	ND	ON	QN
3-nitroaniline	5.155E-03	1.121E-04	ND	QN	ND	ON	QN
2,4-dinltrophenol	5.155E-03	.1.121E-04	QN	QN	ND	ND	QN
dibenzofuran	2.577E-03	7.823E-05	Q	QN	QN	ON	9
2,4-dinitrotoluene	2.577E-03	5.605E-05	S	Q	QN	ND	QN
4-nitrophenol	5.155E-03	1.316E-04	ON	QN	QN	ND	QN
4-chlorophenyl-phenylether	2.577E-03	5.605E-05	QN	QN	ND	QN	Q
diethylphthalate	2.577E-03	5,605E-05	QN	QN	QN	QN	QN
4-nitroaniline	5.155E-03	1.121E-04	Q.	QN	ND	ND	ON
4,6-dinitro-2-methylphenol	5.155E-03	1.121E-04	QN	Q	ND	ND	ND
n-nitrosodiphenylamine(1)	2.577E-03	5.605E-05	QN	Q	QN	QN	ND
4-bromophenyl-phenylether	2.577E-03	5.605E-05	Q	Q	ND	ND	ON
hexachlorobenzene	2.577E-03	5.605E-05	S	Q	ON	ND	QN
pentachlorophenol	5,155E-03	1.121E-04	ND	QN	ND	QN	QN
di-n-butyiphthalate	2.577E-03	1.080E-04	ND	QΝ	QN	ON	Q
butylbenzylphthalate	2.577E-03	5.605E-05	QN	QN	QN	QN	QV
bis(2-ethylhexyl)phthalate	8,448E-02	9.023E-04	1.015E-03	1.709E-04	4.606E-01	3.351E-05	2.303E-01
di-n-octylphthalate	2.577E-03	5.605E-05	QN	QN	QN	QN	QN
Footnotes:							

Table B-24: Air Modeling Output Data for Polynuclear Aromatic Hydrocarbons, Dioxins/Furans, Aldehydes, and Acid Gases 100 meter location

					VA	7	
	155mm	propelling charge	155mm propeiling charge M3 (zone 5), M199 cannon	9 cannon	No. of founds (1)		
		JOOD	DODIC: D540		release duration (t):	2	seconds
	Ne	Net Explosive Weight	ilosive Weight (NEW) in lbs. =>	5.94	Unit Concentration (UC):	1,455E-04	1,455E-04 (g/m³)/(g/s)
		Number	Number of Items = 1				
		SF6 Leak Rate Dilution Factor	ilution Factor =>	0.95			
	· 10 14 1	· · · · · · · · · · · · · · · · · · ·	Mendilier Strike of		Total Mass of Substance	Average Modeled	Substance Emission Rate for
Compound	Measured Actual	Measured Background	Average Adjusted Emission Factor	Average Adjusted	(grams/ltem)	One Round (grams/m³)	One Round (g/sec)
	(mg/m ₃)	Concentration (mg/m³)	(lb/ltem) EF	(Ib/Ib NEW)	M	CONC	ER,
PAHs (TO-13 Method)				٠			
acenaphthylene	2.760E-04	1.328E-06	3.337E-06	5.618E-07	1.514E-03	1.101E-07	7.568E-04
acenaphthene	8.752E-05	9.544E-05	QN	QN	QN	Q	QN
fluorene	2.120E-04	6.502E-05	1.786E-06	3.007E-07	8.101E-04	5.894E-08	4.051E-04
phenanthrene	4.889E-04	6.428E-05	5.159E-06	8.685E-07	2.340E-03	1.702E-07	1.170E-03
anthracene	5.970E-05	4.197E-06	6.743E-07	1.135E-07	3.058E-04	2.225E-08	1.529E-04
fluoranthene	3.011E-04	7.852E-06	3.563E-06	5.998E-07	1,616E-03	1.176E-07	8.081E-04
pyrene	9.009E-04	6.908E-06	1.086E-05	1.829E-06	4.927E-03	3.584E-07	2.463E-03
benzo(a)anthracene	5.147E-05	1.390E-07	6.236E-07	1.050E-07	2.829E-04	2,058E-08	1.414E-04
chrysene	5.560E-05	3.878E-07	6.708E-07	1.129E-07	3.043E-04	2.214E-08	1.521E-04
benzo(b)fluoranthene	1.001E-04	2.220E-07	1.213E-06	2.042E-07	5.501E-04	4.002E-08	2.751E-04
benzo(k)fluoranthene	1.311E-04	9.826E-08	1.592E-06	2.680E-07	7.221E-04	5,254E-08	3.611E-04
benzo(a)pyrene	1.833E-04	8.980E-08	2.226E-06	3.747E-07	1.010E-03	7.345E-08	5.048E-04
indeno(1,2,3-cd)pyrene	2.940E-04	1.659E-07	3.570E-06	6.010E-07	1,619E-03	1.178E-07	8.096E-04
dibenz(a.h)anthracene	9.271E-06	5.605E-08	1.126E-07	1.896E-08	5.109E-05	3.717E-09	2.554E-05
benzo(g,h,l)perylene	7.054E-04	2.408E-07	8.566E-06	1.442E-06	3.886E-03	2.827E-07	1.943E-03
Dioxin/Furan Data							
2378-TCDD	8.448E-09	8.000E-12	1.026E-10	1.728E-11	4.655E-08	3.387E-12	2.328E-08
12378-PECDD	1.185E-09	9.000E-12	1.429E-11	2.405E-12	6.480E-09	4.714E-13	3.240E-09
123478-HXCDD	6.655E-10	1.050E-11	QN	QN	ND	2	Q
123678-HXCDD	3,434E-09	1.700E-11	4.151E-11	6.989E-12	1.883E-08	1.370E-12	9.415E-09
123789-HXCDD	1.261E-09	1.550E-11	1.513E-11	2.546E-12	6.861E-09	4.991E-13	3.430E-09
1234678-HPCDD	2.972E-08	2.495E-10	3.580E-10	6.027E-11	1.624E-07	1,181E-11	8.120E-08
OCDD	1.730E-07	1.587E-09	2.082E-09	3.505E-10	9.444E-07	6.870E-11	4.722E-07
2378-TCDF	3.725E-09	1.100E-11	4.511E-11	7.595E-12	2.046E-08	1,489E-12	1.023E-08
12378-PECDF	3.500E-09	1.050E-11	4.239E-11	7.137E-12	1.923E-08	1.399E-12	9.614E-09
23478-PECDF	1.641E-09	1.550E-11	1.975E-11	3.325E-12	8.957E-09	6.516E-13	4.479E-09
123478-HXCDF	2.772E-09	2.800E-11	3.334E-11	5.612E-12	1.512E-08	1.100E-12	7.560E-09
123678-HXCDF	1.185E-09	1.450E-11	1.422E-11	2.394E-12	6.450E-09	4,692E-13	3.225E-09
123789-HXCDF	3.800E-10	6,000E-12	QN	QN	ND	Q	Q

Table B-24: Air Modeling Output Data for Polynuclear Aromatic Hydrocarbons, Dioxins/Furans, Aldehydes, and Acid Gases 100 meter location

ויט ווופופו וסכמווסוו	ı						
	155mm pro	propelling charge	pelling charge M3 (zone 5), M199 cannon	9 cannon	No. of rounds (1)	-	rounds
		DOD	DODIC: D540		release duration (t):	2	seconds
	Ν	Net Explosive Weight (NEW) in Ibs.	(NEW) in lbs. =>	5.94	Unit Concentration (UC):	1,455E-04	1.455E-04 (g/m³)/(g/s)
		Number of Items = 1 SF6 Leak Rate Dilution Factor	Number of Items = 1 Rate Dilution Factor =>	0.95			
			भिल्लिमिति मेर्डिमिर्ट मार्डि		Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration	Measured Background	Average Adjusted Emission Factor	Average Adjusted Emission Factor	Emitted (grams/item)	Concentration for One Round (grams/m³)	Emission Rate for One Round (g/sec)
	(mg/m ₃)	(mg/m ₃)	EF	(Ib/Ib NEW)	Σ	CONC	ER,
234678-HXCDF	1.157E-09	1.200E-11	1.391E-11	2.342E-12	6.310E-09	4.590E-13	3.155E-09
1234678-HPCDF	1.244E-08	7.750E-11	1.502E-10	2.529E-11	6.814E-08	4.957E-12	3.407E-08
1234789-HPCDF	5.860E-10	8.000E-12	7.022E-12	1.182E-12	3.185E-09	2.317E-13	1.593E-09
OCDF	7.895E-09	1.105E-10	9.457E-11	1.592E-11	4.290E-08	3.121E-12	2.145E-08
Aldehydes							
Formaldehyde	1.228E-02	1.228E-02	Q Q	QN	ND	QN	Q
Acetaldehyde	1.802E-02	1.802E-02	S	QN	ON	QN	QN
Acetone	2.375E-02	4.751E-02	ND	QN	QN	QN	QN
Acrolein	2.294E-02	2.294E-02	ND	QN	QN	QN	QV
Proprionaldehyde	2.374E-02	2.374E-02	ND	QN	QN	QN.	QN
Crotonaldehyde	2.867E-02	2.867E-02	ND	QN	QN	<u>Q</u>	S
Butyraldehyde	2.949E-02	2.949E-02	ND	QN	QN	Q	QN
Benzaldehyde	4.340E-02	4.340E-02	ON	QN	QN	Q	S
Isovaleraldehyde	3.523E-02	3.523E-02	ND	QN	QN	2	S
Valeraldehyde	3.523E-02	3.523E-02	Q	QN	QN	ON .	QN
o,m,p-Tolualdehyde	1.474E-01	9.828E-02	<u>Q</u>	QN	QN	QN	QN
Hexaldehyde	4.097E-02	4.097E-02	Q	Q	ON	QN	QN
2,5-Dimethylbenzaldehyde	4.097E-02	4.097E-02	ND	QN	QN	QN	Q
Acid gases							
Hydrogen fluoride	1.400E-01	1.400E-01	ND ND	QN	QN	QN	QN
Hydrogen chloride	1.300E-01	1.300E-01	ND ·	QN	ON	QN	QV.
Hydrogen bromide	1.400E-01	1.400E-01	ND	Q.	QN	QN	QN
Nitric Acid	1.400E-01	1.400E-01	ND	QN	QN	9	QV
Phosphoric acid	1.400E-01	1,400E-01	ND	QN	QN	QN	QN
Sulfuric Acid	1.400E-01	1.400E-01	ND	QN	QN	ND	QN
Footnotes:							

'ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study) ND = Not Detected Footnotes:

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Table B-25: Air Modeling Output Data for Cyanide and Energetics - 100 meter location

	155mm	propelling charge DODI	155mm propelling charge M3 (zone 5), M199 cannon DODIC: D540	9 cannon	No. of rounds (I) release duration (t):	2	1 rounds 2 seconds
	θŽ	Net Explosive Weigh Number SF6 Leak Rate C	losive Weight (NEW) in lbs. => Number of Items = 1 Leak Rate Dilution Factor =>	5.94	Unit Concentration (UC):	1,455E-04	1.455E-04 (g/m³)/(g/s)
	The state of the s		There is the first section of	and the second s	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (Ib/Item) EF	Average Adjusted Emission Factor (Ib/Ib NEW)	Emitted (grams/item) M	Concentration for One Round (grams/m³)	Emission Rate for One Round (g/sec) ER,
Particulate Cyanide and HCN							
Particulate Cyanide	1.200E-01	8.000E-02	1.458E-03	2.454E-04	6.613E-01	4.811E-05	3.306E-01
Hydrogen Cyanide	1.650E+00	8.500E-02	2.005E-02	3.375E-03	9.092E+00	6.615E-04	4.546E+00
Energetics Data							
Nitrobenzene	4.819E-01	2.031E-01	QN	QN	QN	QN	QN
2-Nitrotoluene	4.819E-01	2.031E-01	QN	QN	ND	ND	QN
3-Nifrotoluene	4.819E-01	2.031E-01	DN	QN	ON	QN	QN
4-Nitrotoluene	4.819E-01	2.031E-01	QN	QN	ND	ND	ΩN
Nitroglycerine	4.819E-01	2.031E-01	ON	QN.	QN	QN	QN
1,3-Dinitrobenzene	4.819E-01	2.031E-01	QN	ON	ND	ON	QN
2,6-Dinitrotoluene	4.819E-01	2.031E-01	QN	QΝ	QN	ON	ON
2,4-Dinitrotoluene	4.819E-01	2.031E-01	QN	QN	QN	QN	2
1,3,5-Trinitrobenzene	4.819E-01	2.031E-01	QN	QN	QN	QN	QN
2,4,6-Trinitrotoluene	4.819E-01	2.031E-01	ΔN	· ON	ND	ND	QN
RDX	4.819E-01	2.031E-01	Q	2	ND	QN	QN
4-Amino-2,6-Dinitrotoluene	4.819E-01	2.031E-01	Q	2	ND	QN	QN
2-Amino-4,6-Dinitrotoluene	4.819E-01	2.031E-01	QN	ON	ON	ON	QN
Tetryl	4.819E-01	2.031E-01	QN	ON	QN	QN	QN
HMX	9.639E-01	4.062E-01	QN	QN	QN	QN	ON
Pentaerythritoltetranitrate	9.639E-01	4.062E-01	QN	ON	ON	QN	2
Dibutyl phthalate	2.410E+01	1.016E+01	QN	QN	QN	QN	QN
Dioctyl phthalate	2.410E+01	1.016E+01	ND O	2	ND	QN	QN
Diphenylamine	1.205E+01	5.078E+00	QN	QN	QN	QN	QN

Footnotes:

AIR MODELING OUTPUT DATA FOR CHARGE M3, FIRED FROM THE M199 CANNON, ZONE 5, 200 METERS DOWNWIND

Table B-26: Air Modeling Output Data for Gases, Metals, and Particulates - 200 meter location

	155mm	propelling charge	155mm propelling charge M3 (zone 5), M199 cannon DODIC: D540	9 cannon	No. of rounds (I)		rounds
	Φ Z	Net Explosive Weight (NEW) in ibs. Number of items = 1 SF6 Leak Rate Dilution Factor	/e Weight (NEW) in ibs. => Number of items = 1 ak Rate Dilution Factor =>	5.94	Unit Concentration (UC):	6.505E-05	6.505E-05 (g/m³)/(g/s)
	1967 (A. C. 1965)		Salu a transport	And the second second and the second and	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (Ib/Item) EF	Average Adjusted Emisston Factor (tb/lb NEW)	Emitted (grams/item) M	Concentration for One Round (grams/m³) CONC	Emission Rate for One Round (g/sec) ER,
Gases							
NH3	8.400E+00	NA	9.695E-02	1.632E-02	4.397E+01	7.151E-04	1.099E+01
CO2	1.080E+02	NA	1.246E+00	2.098E-01	5.654E+02	9.194E-03	1,413E+02
CO	2.841E+02	NA	3.278E+00	5.519E-01	1.487E+03	2.418E-02	3.717E+02
NOx (as NO)	3.936E+00	NA	4.543E-02	7.647E-03	2.060E+01	3.351E-04	5,151E+00
CH4	2.178E+00	NA	QN	QN	QN	9	QN
SO2	5.240E-01	NA	QV	ON	QN	2	QN
Combined Particulate							
TSP	1.122E+01	5.300E-02	1.356E-01	2.284E-02	6.153E+01	1.001E-03	1.538E+01
PM10	8.017E+00	4.233E-02	9.688E-02	1.631E-02	4.394E+01	7.146E-04	1.099E+01
PM2,5	3.180E+00	2.400E-02	3.834E-02	6.455E-03	1.739E+01	2.828E-04	4.348E+00
Metals							
Antimony	2.819E-04	4.345E-06	3.371E-06	5.676E-07	1.529E-03	2.487E-08	3.823E-04
Arsenic	6.180E-04	3.091E-06	7.470E-06	1.258E-06	3.388E-03	5,510E-08	8.471E-04
Barium	6.071E-03	3.255E-05	7.336E-05	1.235E-05	3.327E-02	5.411E-07	8.319E-03
Beryllium	7.806E-05	1.649E-06	QN	QN	QN	QV	QN
Cadmium	2.103E-04	1.649E-06	2.555E-06	4.301E-07	1.159E-03	1.885E-08	2.897E-04
Chromium	1.334E-03	7.167E-06	1.611E-05	2.713E-06	7.309E-03	1.189E-07	1.827E-03
Cobalt	1.713E-04	3.763E-06	2.035E-06	3.426E-07	9.231E-04	1.501E-08	2.308E-04
Copper	1.518E+00	1.159E-03	1.842E-02	3.102E-03	8.357E+00	1.359E-04	2.089E+00
Lead	3.036E-02	6.770E-05	3.680E-04	6.195E-05	1.669E-01	2.714E-06	4.173E-02
Manganese	7.480E-03	3.086E-05	9.050E-05	1.524E-05	4.105E-02	6.676E-07	1.026E-02
Nickel	2.494E-03	1.433E-05	3.012E-05	5.071E-06	1,366E-02	2.222E-07	3.415E-03
Selenium	2.602E-04	5.497E-06	Q	QN	QN	QN	QN
Silver	1.019E-04	1.099E-06	1.238E-06	2.084E-07	5.615E-04	9.132E-09	1.404E-04
Thallium	7.806E-05	1.613E-06	QN	QN	QN	S	QN
Zinc	2.385E-01	1,445E-04	2.896E-03	4.875E-04	1.314E+00	2.136E-05	3.284E-01
Footnotes:	- * ₹-2						
¹ ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study)	(for additional info	ormation on the	data, refer to the	Firing Point Emiss	ions Study)		
ND = Not Detected					15		

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Table B-27: Air Modeling Output Data for Volatile Organic Compounds - 200 meter location

	188mm nrong	propelling charge	lling charge M3 (zone 5). M199 cannon	9 cannon	No. of rounds (1)	1	rounds
)JOOO	DODIC: D540		release duration (t):	4	seconds
	eN.	Net Explosive Weight	osive Weight (NEW) in ibs. =>	5.94	Unit Concentration (UC):	6.505E-05	6.505E-05 (g/m³)/(g/s)
				800			
			Leak Kate Dilution Factor =>	CR:0			
		AND THE PROPERTY OF THE PROPER	GROWTER CORE		Total Mass of Substance	Average Modeled	Substance Emission Pate for
Compound	Measured Actual Concentration	Measured Background Concentration	Average Adjusted Emission Factor (lb/item)	Average Adjusted Emission Factor	(grams/item)	One Round (grams/m³)	One Round (g/sec)
	(mg/m²)	(mg/m³)	H F	(ID/ID INEW)	Σ	CONC	ER,
VOCs							
Dichlorodifluoromethane	3.762E-03	3.762E-03	QN	Q	ND	QV	QN
Methyl Chloride	1.594E-03	1.594E-03	QN	QN	ON	QN	QN.
Dichlorotetrafluoroethane	4.683E-03	4.683E-03	QN	QN	ND	ON	QN
Vinyi Chloride	5.069E-03	5.069E-03	QN	2	QN	QN	2
1,3-Butadiene	1.790E-03	1.790E-03	QN	2	QN	Q	Q
Methyl Bromide	3.073E-03	3.073E-03	QN	Q	QN	QN	2
Ethyl Chloride	2.112E-03	2.112E-03	ON	Q	QN	QN	Q
Trichlorofluoromethane	3.934E-03	3.934E-03	QN	2	ΩN	Q	2
1,1-Dichloroethene	9.184E-03	6.696E-03	3.023E-05	5.090E-06	1.371E-02	2.230E-07	3.429E-03
Dichloromethane	1.519E-01	5.722E-03	1.776E-03	2.989E-04	8.054E-01	1.310E-05	2.014E-01
3-Chloropropane	2.754E-03	2,754E-03	QN	QN	ND	Q	S
1,1,2-Trichloro-1,2,2-trifluoroethane	4.752E-03	5.750E-03	QN	QN	ΩN	QN	QN.
1,1-Dichloroethane	3.159E-03	3.159E-03	QN	QN	QN	QN	ND
cls-1,2-Dichloroethene	3.295E-03	3.295E-03	QN	QN	ND	QN	9
Trichloromethane	4.099E-03	4.099E-03	QN	QN	ND	Q	QN
1,2-Dichloroethane	3,443E-03	3.443E-03	QN	QN	ND	QN	S
1,1,1-Trichtoroethane	2.070E-02	1.095E-01	QN	QN	QN	Q	2
Benzene	7.375E-02	2.329E-03	8.959E-04	1,508E-04	4.064E-01	6,609E-06	1.016E-01
Carbon Tetrachloride	4.529E-03	4.529E-03	Q	임	QN	2	Q
1,2-Dichloropropane	3.419E-03	3.419E-03	QN	QN	QN	Q	Q
Trichloroethene	3.866E-03	3.866E-03	QN	Q	QN	2	Q
cis-1,3-Dichloropropene	3.360E-03	3.360E-03	S	Q	ON	2	QN
trans-1,3-Dichloropropene	2.860E-03	2.860E-03	S	Q	ON	QN	Q
1,1,2-Trichloroethane	3.877E-03	3.877E-03	NO.	2	QN	Q	QN
Toluene	5,655E-03	3.610E-03	2.485E-05	4.183E-06	1.127E-02	1.833E-07	2.818E-03
1,2-Dibromoethane	5.844E-03	5.844E-03	S	QN	ON	Q	Q
Tetrachloroethene	4.475E-03	4.475E-03	2	2	QN	2	2

Table B-27: Air Modeling Output Data for Volatile Organic Compounds - 200 meter location

	155mm prot	propelling charge DODI	pelling charge M3 (zone 5), M199 cannon DODIC: D540	9 cannon	No. of rounds (I) release duration (t):	F 4	1 rounds 4 seconds
	NΘ	Net Explosive Weight (NEW) in Ibs. Number of items = 1 SF6 Leak Rate Dilution Factor	/e Welght (NEW) in Ibs. => Number of Items = 1 ak Rate Dilution Factor =>	5.94	Unit Concentration (UC):	6.505E-05	6.505E-05 (g/m³)/(g/s)
		Work Have Willake all	W. Balente	The market was to the state of	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual	Measured	Average Adjusted	Average Adjusted	Emitted (grams/item)	Concentration for One Round	Emission Rate for One Round
	Concentration (mg/m³)	Concentration (mg/m³)	Emission Factor (lb/ltem) EF	Emission Factor (Ib/Ib NEW)	Ż	(grams/m³) CONC	(g/sec) ER,
Chlorobenzene	2,305E-04	2.305E-04	Q	QN	QN	QN	QN
Ethylbenzene	2.344E-03	2.344E-03	QV	QN	QN	ND	Q
m&p-Xylene	2.257E-03	2.257E-03	Q	QN	QN	QN	QN
Styrene	2.641E-03	2.641E-03	Q	QN	ON	ND	S
1,1,2,2-Tetrachioroethane	4.466E-03	4.466E-03	Q	QN	QN	QN	S
o-Xylene	2.474E-03	2.474E-03	QN	QN	QN	Q	Q
4-Ethyltoluene	2.214E-03	2.214E-03	Q	QN	QN	QV	Q
1,3,5-Trimethylbenzene	2,460E-03	2.460E-03	Q	Q	ON	S	QN
1,2,4-Trimethyibenzene	2.312E-03	2.312E-03	Q	QN	QN	Q	QN
Benzyl Chloride	5.076E-03	5.076E-03	Q	QN	QN	Q.	QN
m-Dichlorobenzene	3.366E-03	3.366E-03	2	QN	QN	QN	ND
p-Dichlorobenzene	2.945E-03	2.945E-03	QN	QN	ON	QV	QN
o-Dichlorobenzene	3.606E-03	3.606E-03	Q	QN	ND	QN	QN
1,2,4-Trichlorobenzene	4.526E-03	4.526E-03	2	Q	QN	QN	QN
Hexachiorobutadiene	4.690E-03	4.690E-03	Q	QN	QN	Q.	QN
Methane	3.094E+00	1.364E+00	2.102E-02	3.539E-03	9.534E+00	1.550E-04	2.384E+00
Ethane	6.764E-01	6.764E-01	2	Q	QN	DN	QN
Ethylene	6.310E-01	6.310E-01	Q	Q	QN	ND	Q.
Propane	9.920E-01	9.920E-01	2	Q	ND	QN	QN
Acetylene	5.858E-01	5.858E-01	Q	QN	QN	QN	S
Isobutane	1.307E+00	1.307E+00	Q	QN	QN	QN	QN.
n-Butane	1.307E+00	1.307E+00	2	Q	QN	QN	9
Propylene	9.466E-01	9.466E-01	QN	ND	QN	ND	QN
Footnotes:							

Table B-28; Air Modeling Output Data for Semi-Volatile Organic Compounds - 200 meter location

	155mm prope	propelling charge	lling charge M3 (zone 5), M199 cannon	9 cannon	No. of rounds (I)	1	rounds
	S.	Net Explosive Weigh	osive Weight (NEW) in lbs. =>	5.94	Unit Concentration (UC):	6.505E-05	6.505E-05 (g/m³)/(g/s)
		Number of SF6 Leak Rate D	Number of Items = 1 Leak Rate Dilution Factor =>	0.95			
	Sales and the sa	at aktoria	MC GORD COARROW	The state of the s	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (ma/m³)	Average Adjusted Emission Factor (lb/item) EF	Average Adjusted Emission Factor (Ib/Ib NEW)	Emitted (grams/ltem) M	Concerniation for One Round (grams/m³)	Emission Kate for One Round (g/sec) ER,
2000							
n-nitrosodimethylamine	2.577E-03	5.605E-05	QN	QN	QN	QN	QN
bis(2-chloroethyl)ether	2.577E-03		QN	S	QN	QN	S
phenol	1.025E-02	7.120E-03	3.806E-05	6.407E-06	1.726E-02	2.808E-07	4.316E-03
2-chlorophenol	2.577E-03	5.605E-05	QN	QN	QN	ON	QN
1,3-dichlorobenzene	2.577E-03	5.605E-05	QN	QN	QN	Q.	S
1,4-dichlorobenzene	2.577E-03	5.664E-05	QN	QN	QN	QN	QN
1,2-dichlorobenzene	2.577E-03	5.605E-05	QN	Q	QN	Q.	QN
benzył alcohol	2.577E-03	5,605E-05	QN	QN	ND	ND	QN
bis(2-chloroisopropyl)ether	2.577E-03	5,605E-05	QN	QN	QN	ND	ON
2-methylphenol	2.577E-03	5.605E-05	QN	QN	ND	ON	QN
hexachloroethane	2.577E-03	5.605E-05	QN	Q	QN	ND ND	ND
n-nitroso-di-n-propylamine	2.577E-03	5.605E-05	QN	QN	ND	ON	QN
4-methylphenol	2.577E-03		QN	Q	QN	QN.	QN
nitrobenzene	2.577E-03	5.605E-05	QN	QN	QN	QN	QN
isophorone	2.577E-03		QN	Q	QN	QN	Q
2-nitrophenol	2.577E-03		QN	Q	ND	QN	ND
2,4-dimethylphenol	2.577E-03		Q	2	QV	QN	Q
bis(2-chloroethoxy)methane	2.577E-03		Q.	2	QN	QN	Q
2,4-dichlorophenol	2.577E-03		ON	ON	QN	Q	ON
1,2,4-trichlorobenzene	2.577E-03	5.605E-05	QN	QN	ND	ON	DN
naphthalene	2.205E-03		2.513E-05	4.231E-06	1.140E-02	1.854E-07	2.850E-03
4-chloroaniline	2.577E-02	5.605E-04	ON	QN	ND	QN	QN
hexachlorobutadiene ·	2.577E-03	5.605E-05	ND	2	QN	QN	QN
4-chloro-3-methylphenol	2.577E-03		QQ.	2	QV	QN	QN
2-methylnaphthalene	2.577E-03	1.694E-04	QN	Q	QN	QN	Q
hexachtorocyclopentadiene	2.577E-03	5.605E-05	QN	9	QN	ND	ΩN
2,4,6-trichlorophenol	2.577E-03	5.605E-05	Q	Q.	QN	QN	QN

Table B-28: Air Modeling Output Data for Semi-Volatile Organic Compounds - 200 meter location

	155mm pro	propelling charge	วelling charge M3 (zone 5), M199 cannon กดอเด: อริสด	9 cannon	No. of rounds (I)	-	rounds
	eN.	Net Explosive Weight (NEW) In Ibs. Number of Items = 1	/e Weight (NEW) in lbs. =>	5.94	Unit Concentration (UC):	6.505E-05	6.505E-05 (g/m³)/(g/s)
		SF6 Leak Rate Dilution Factor	ilution Factor =>	0.95			
		W. W. Callellin		200	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual	Measured	Average Adjusted	Average Adjusted	(grams/item)	Concentration for One Round	Emission Kate for One Round
	Concentration (mg/m³)	Concentration (mg/m³)		Emission Factor (Ib/Ib NEW)	×	(grams/m³) CONC	(g/sec) ER ₁
2,4,5-trichlorophenol	2.577E-03	5.605E-05	QN	QN	QN	Q.	ΩN
2-chtoronaphthalene	2.577E-03	5.605E-05	QN	QN	QN	2	QN
2-nitroaniline	2.577E-03	5.605E-05	QN	QN	QN	S	QN
dimethylphthalate	2.577E-03	5.605E-05	QN	DD	QN	QN	QN
2,6-dinifrotoluene	2.577E-03	5.721E-05	QN	ND	QN	QN	QN
3-ntroaniline	5.155E-03	1.121E-04	QN	QN	QN	QN	QN
2,4-dinitrophenol	5.155E-03	1.121E-04	QN	QN	QN	QN	QN
dibenzofuran	2.577E-03	7.823E-05	Q	QN	GN	QN	Q
2,4-dinitrotoluene	2.577E-03	5.605E-05	Q	QN	QN	QN	QN
4-nitrophenol	5,155E-03	1.316E-04	QN	QN	QN	QN	QN
4-chlorophenyl-phenylether	2.577E-03	5.605E-05	2	S	QN	QN.	QN
diethylphthalate	2.577E-03	5.605E-05	9	QN	ND	ON	QN
4-nitroaniline	5,155E-03	1,121E-04	QN	QN	QN	ND	QN
4,6-dinitro-2-methyiphenol	5.155E-03	1.121E-04	2	Q	ND	QN	QN
n-nitrosodiphenylamine(1)	2.577E-03	5.605E-05	Q	QN	QN	QN	QN
4-bromophenyl-phenylether	2.577E-03	5.605E-05	Q	QN	GN	QN	QN
hexachlorobenzene	2.577E-03	5.605E-05	Q	QN	QN	QN	QN
pentachlorophenol	5.155E-03	1,121E-04	Q	ND	QN ·	QN	QN
di-n-butyiphthalate	2.577E-03	1.080E-04	QN	DN	QN	QN	QN
butylbenzylphthalate	2.577E-03	5.605E-05	2	ND	QN	QV	QV
bis(2-ethylhexyl)phthalate	8,448E-02	9.023E-04	1.015E-03	1.709E-04	4.606E-01	7.490E-06	1.151E-01
di-n-octyiphthalate	2.577E-03	5.605E-05	Q	QN	QN	QN	QN
Footnotes:							

Table B-29: Air Modeling Output Data for Polynuclear Aromatic Hydrocarbons, Dioxins/Furans, Aldehydes, and Acid Gases 200 meter location

	155mm	oropelling charge DODI	155mm propelling charge M3 (zone 5), M199 cannon DODIC: D540	9 cannon	No. of rounds (I) release duration (t):	4	rounds seconds
	Nei	Net Explosive Weigh	osive Weight (NEW) in lbs. =>	5.94	Unit Concentration (UC):	6.505E-05	6.505E-05 (g/m³)/(g/s)
		Number	Number of Items = 1	800			
	problem is the country of the state of the s	SFO LEAK KAIG D	1	Ce'n			
		3.63.4[1][6]	The state of the state of	May to the state of	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (tb/item) EF	Average Adjusted Emission Factor (ib/ib NEW)	(grams/ltem)	One Round (grams/m³)	One Round (g/sec) ER,
PAHs (TO-13 Method)							
acenaphthylene	2.760E-04	1.328E-06	3.337E-06	5.618E-07	1.514E-03	2.462E-08	3.784E-04
acenaphthene	8.752E-05	9.544E-05	QN	QN	ND	ON	QN
fluorene	2.120E-04	6.502E-05	1.786E-06	3.007E-07	8.101E-04	1.317E-08	2.025E-04
phenanthrene	4.889E-04	6.428E-05	5.159E-06	8.685E-07	2.340E-03	3.806E-08	5.850E-04
anthracene	5.970E-05	4.197E-06	6.743E-07	1.135E-07	3.058E-04	4.974E-09	7.646E-05
fluoranthene	3.011E-04	7.852E-06	3.563E-06	5.998E-07	1.616E-03	2.628E-08	4.040E-04
ругепе	9.009E-04	6.908E-06	1,086E-05	1.829E-06	4.927E-03	8.012E-08	1.232E-03
benzo(a)anthracene	5.147E-05	1.390E-07	6.236E-07	1.050E-07	2.829E-04	4.600E-09	7.072E-05
chrysene	5.560E-05	3.878E-07	6.708E-07	1.129E-07	3.043E-04	4.948E-09	7.607E-05
benzo(b)fluoranthene	1.001E-04	2.220E-07	1.213E-06	2.042E-07	5.501E-04	8.947E-09	1.375E-04
benzo(k)fluoranthene	1.311E-04	9.826E-08	1.592E-06	2.680E-07	7.221E-04	1.174E-08	1.805E-04
benzo(a)pyrene	1.833E-04	8.980E-08	2.226E-06	3.747E-07	1.010E-03	1.642E-08	2.524E-04
indeno(1,2,3-cd)pyrene	2.940E-04	1.659E-07	3.570E-06	6.010E-07	1.619E-03	2.633E-08	4.048E-04
dibenz(a,h)anthracene	9.271E-06	5.605E-08	1.126E-07	1.896E-08	5.109E-05	8.308E-10	1.277E-05
benzo(g,h,i)perylene	7.054E-04	2.408E-07	8.566E-06	1.442E-06	3.886E-03	6.319E-08	9.714E-04
Dioxin/Furan Data							
2378-TCDD	8.448E-09	8.000E-12	1.026E-10	1.728E-11	4.655E-08	7.571E-13	1.164E-08
12378-PECDD	1.185E-09	9.000E-12	1.429E-11	2.405E-12	6.480E-09	1.054E-13	1.620E-09
123478-HXCDD	6.655E-10	1.050E-11	QV	2	QN	ΩN	QN
123678-HXCDD	3.434E-09	1.700E-11	4.151E-11	6.989E-12	1.883E-08	3.062E-13	4.707E-09
123789-HXCDD	1.261E-09	1.550E-11	1.513E-11	2.546E-12	6.861E-09	1.116E-13	1.715E-09
1234678-HPCDD	2.972E-08	2.495E-10	3.580E-10	6.027E-11	1.624E-07	2.641E-12	4.060E-08
OCDD	1.730E-07	1.587E-09	2.082E-09	3.505E-10	9,444E-07	1.536E-11	2.361E-07
2378-TCDF	3.725E-09	1.100E-11	4.511E-11	7.595E-12	2,046E-08	3.328E-13	5.116E-09
12378-PECDF	3.500E-09	1.050E-11	4,239E-11	7.137E-12	1,923E-08	3.127E-13	4.807E-09
23478-PECDF	1.641E-09	1.550E-11	1.975E-11	3.325E-12	8.957E-09	1.457E-13	2.239E-09
123478-HXCDF	2.772E-09	2.800E-11	3.334E-11	5.612E-12	1.512E-08	2,459E-13	3.780E-09
123678-HXCDF	1.185E-09	1.450E-11	1.422E-11	2.394E-12	6.450E-09	1.049E-13	1.613E-09
123789-HXCDF	3.800E-10	6.000E-12	Q.	QN	QN	QN	QN

Table B-29: Air Modeling Output Data for Polynuclear Aromatic Hydrocarbons, Dioxins/Furans, Aldehydes, and Acid Gases 200 meter location

	155mm pr	propelling charge	opelling charge M3 (zone 5), M199 cannon DODIC: D540	y cannon	No. of rounds (I) release duration (t):	- 4	rounds
	Se	Net Explosive Weight (NEW) in Ibs.	t (NEW) in lbs. =>	5.94	Unit Concentration (UC):	6.505E-05	6.505E-05 (g/m³)/(g/s)
		Number of Items = 1 SF6 Leak Rate Dilution Factor	Number of Items = 1 ak Rate Dilution Factor =>	0.95			
		111111111111111111111111111111111111111	Miterial in this will be	The second secon	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (Ib/item) EF	Average Adjusted Emission Factor (tb/lb NEW)	Emitted (grams/item) M	Concentration for One Round (grams/m³) CONC	Emission Rate for One Round (g/sec) ER ₁
234678-HXCDF	1.157E-09	1.200E-11	1.391E-11	2.342E-12	6.310E-09	1.026E-13	1.577E-09
1234678-HPCDF	1.244E-08	7.750E-11	1.502E-10	2.529E-11	6.814E-08	1.108E-12	1.703E-08
1234789-HPCDF	5.860E-10	8.000E-12	7.022E-12	1.182E-12	3.185E-09	5.180E-14	7.963E-10
OCDF	7.895E-09	1.105E-10	9.457E-11	1.592E-11	4.290E-08	6.976E-13	1.072E-08
Aldehydes							
Formaldehyde	1.228E-02	1.228E-02	QN	QN	QN	QN	2
Acetaldehyde	1.802E-02	1.802E-02	QN	QN	QN	SN C	2
Acetone	2.375E-02	4.751E-02	QN	QN	QN	9	Q
Acrolein	2.294E-02	2.294E-02	QN	QN	QN	ON ON	Q
Proprionaldehyde	2.374E-02	2.374E-02	ON	QN	GN	QN	QV.
Crotonaldehyde	2.867E-02	2.867E-02	QN ND	QN	QN	ON	2
Butyraldehyde	2.949E-02	2.949E-02	ON	ON	QN	ND	QN
Benzaldehyde	4.340E-02	4.340E-02	QN	ΩN	QN	QN	Q.
Isovaleraldehyde	3.523E-02	3.523E-02	QN	QN	ND	ON	QN
Valeraldehyde	3.523E-02	3.523E-02	QN	Q	QN	QN	QN
o,m,p-Tolualdehyde	1.474E-01	9.828E-02	QN	QN	QN	QN	QN
Hexaldehyde	4.097E-02	4.097E-02	QN	9	QN	QN	QN
2,5-Dimethylbenzaldehyde	4.097E-02	4.097E-02	QN	QN	QN	QN	QN
Acid gases							
Hydrogen fluoride	1.400E-01	1.400E-01	ΩN	Q	QN	QN	QN
Hydrogen chloride	1.300E-01	1.300E-01	QN	QN	QN	QN	QN
Hydrogen bromide	1,400E-01	1.400E-01	QN	QN	QN	QN	QN
Nitric Acid	1.400E-01	1.400E-01	QN	ΩN	QN	ON	QN
Phosphoric acid	1.400E-01	1.400E-01	Q	S	QN	QN	QN
Sulfuric Acid	1.400E-01	1.400E-01	QN	QN	ON	QN	QN
Footnotes:	ţ;						

Table B-30: Air Modeling Output Data for Cyanide and Energetics - 200 meter location

	155mm prop	propelling charge DODI	elling charge M3 (zone 5), M199 cannon DODIC: D540	9 cannon	No. of rounds (I): release duration (I):	1	1 rounds 4 seconds
	eN	Net Explosive Weigh	slosive Weight (NEW) in lbs. =>	5.94	Unit Concentration (UC):	6.505E-05	6.505E-05 (g/m³)/(g/s)
		Number of Items = 1 SF6 Leak Rate Dilution Factor	Number of Items = 1 ak Rate Difution Factor =>	0.95			
		Makanin	MENTING WINE OR PROPERTY	ha Toron artis in the branco and a	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (Ib/Item) EF	Average Adjusted Emission Factor (Ib/lb NEW)	Emitted (grams/item) M	Concentration for One Round (grams/m³)	Emission Rate for One Round (g/sec) ER,
Particulate Cyanide and HCN							
Particulate Cyanide	1.200E-01	8.000E-02	1.458E-03	2.454E-04	6.613E-01	1.075E-05	1.653E-01
Hydrogen Cyanide	1.650E+00	8.500E-02	2.005E-02	3.375E-03	9.092E+00	1.479E-04	2.273E+00
Energetics Data							
Nitrobenzene	4.819E-01	2.031E-01	QN	QN	QN	QN	QN
2-Nitrotoluene	4.819E-01	2.031E-01	QN	QN	QN	QN .	QN
3-Nitrotoluene	4.819E-01	2.031E-01	QN	QN	QN .	QN	ΩN
4-Nitrotoluene	4.819E-01	2.031E-01	QN	QN	QN	QN	QN
Nitroglycerine	4.819E-01	2.031E-01	QN	QN	QN	QN	QN
1,3-Dinitrobenzene	4.819E-01	2.031E-01	QN	QN	QN	QN	QN
2,6-Dinitrotoluene	4.819E-01	2.031E-01	ON	QN	QN	QN	QN
2,4-Dinitrotoluene	4.819E-01	2.031E-01	QN	QN	QN	QN	QN
1,3,5-Trinitrobenzene	4.819E-01	2.031E-01	Q	QN	ND	QN	QN
2,4,6-Trinitrotoluene	4.819E-01	2.031E-01	QN	Q	ND	QN	QN
RDX	4.819E-01	2.031E-01	2	QN	ON	QN	QN
4-Amino-2,6-Dinitrotoluene	4.819E-01	2.031E-01	QN	2	ND	ON	ON
2-Amino-4,6-Dinitrotoluene	4.819E-01	2.031E-01	QN	QN	QN	QN	QN
Tetryl	4.819E-01	2.031E-01	QN	QN	QN	QN	QN
HMX	9.639E-01	4.062E-01	ON	ND	QN	ON	QN
Pentaerythritoltetranitrate	9.639E-01	4.062E-01	QN	QN	QN	QN	QN
Dibutyi phthalate	2.410E+01	1.016E+01	QN.	QN	ND	QN	ND
Dioctyl phthalate	2.410E+01	1.016E+01	8	Q	QN	QN	QN
Diphenylamine	1.205E+01	5.078E+00	ON	QN	ND	QN	ND
							The second secon

AIR MODELING OUTPUT DATA FOR CHARGE M3A1, FIRED FROM THE M199 CANNON, ZONE 3, 100 METERS DOWNWIND

Table B-31: Air Modeling Output Data for Gases, Metals, and Particulates - 100 meter location

	155mm pron	Challing charge	elling charge M3A1 (zone 3) M199 cannon	99 cannon	(1) Spanos from No. of	7	openio.
		DOD	DODIC: D540		release duration (t):	2 -	seconds
	S.	Net Explosive Weigh	plosive Weight (NEW) in lbs. =>	3.50	Unit Concentration (UC):	9.348E-05	9.348E-05 (g/m³)/(g/s)
		Number of Items = 1 SF6 Leak Rate Dilution Factor	Number of Items = 1 ak Rate Dilution Factor =>	0.93			
			अस्य अधिकारिक है। एक स्वाप्त	And the same of th	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (lb/item) EF	Average Adjusted Emission Factor (lb/lb NEW)	Emitted (grams/item) M	Concentration for One Round (grams/m³) CONC	Emission Rate for One Round (g/sec) ER ₁
Gases							
NH3	3.780E+00	ΑN	4.363E-02	1.246E-02	1.979E+01	9.249E-04	9.894E+00
CO2	6.480E+01	NA	7.479E-01	2.137E-01	3.392E+02	1.586E-02	1.696E+02
00	1.725E+02	NA	1.991E+00	5.688E-01	9.030E+02	4.221E-02	4.515E+02
NOx (as NO)	2.460E-01	NA	QN	QN	QN	QN.	QN
CH4	2.178E+00	NA	QN	QN	QN	Q	QN
802	5.240E-01	NA	QN	QN	QN	QN	S
Combined Particulate							
TSP	5.189E+00	5.300E-02	6.374E-02	1.821E-02	2.891E+01	1.351E-03	1.446E+01
PM10	3.692E+00	4.233E-02	4.529E-02	1.294E-02	2.054E+01	9.601E-04	1.027E+01
PM2.5	1.999E+00	2.400E-02	2.451E-02	7.003E-03	1.112E+01	5.196E-04	5,559E+00
Metals							
Antimony	1.840E-04	4.345E-06	QN	QN	QN	QV	S
Arsenic	1.193E-04	3.091E-06	1.442E-06	4.121E-07	6.542E-04	3.058E-08	3.271E-04
Barlum	2.518E-03	3,255E-05	3.085E-05	8.814E-06	1.399E-02	6.540E-07	6.996E-03
Beryllium	7.885E-05	1.649E-06	QN	QN	QN	Q	QN
Cadmlum	8.713E-05	1.649E-06	1.081E-06	3.089E-07	4.904E-04	2.292E-08	2.452E-04
Chromlum	7.007E-04	7.167E-06	8.606E-06	2.459E-06	3.904E-03	1.825E-07	1.952E-03
Cobalt	6.461E-05	3.763E-06	7.551E-07	2.157E-07	3.425E-04	1.601E-08	1.713E-04
Copper	6.788E-01	1.159E-03	8.409E-03	2.403E-03	3.814E+00	1.783E-04	1.907E+00
Lead	2.003E-02	6.770E-05	2.478E-04	7.079E-05	1,124E-01	5.253E-06	5.619E-02
Manganese	2.244E-03	3.086E-05	2.747E-05	7.848E-06	1.246E-02	5.823E-07	6.230E-03
Nickel	1.226E-03	1.433E-05	1.504E-05	4.297E-06	6.821E-03	3.188E-07	3.411E-03
Selenium	2.628E-04	5,497E-06	Q	QN	ON	Q	QN
Silver	5.445E-05	1.099E-06	6.758E-07	1.931E-07	3,065E-04	1,433E-08	1.533E-04
Thallium	7.885E-05	1.613E-06	QN	QN	QN	QN	QN
Zinc	1.456E-01	1.445E-04	1,805E-03	5.159E-04	8.189E-01	3.828E-05	4.095E-01
Footnotes:							

	A EFFERNANCE	oprode pulliane	MAZA (cono 2) MA	00 cannon	(I) spainer to oN	4	rounds
1	nadord mineer	Topening citatge	mg charge mistri (come s), miss carmon		Colored direction (1)		Spronde
		IDOD	DODIC: DS40		telease duration (t).	7	Spiiones
	eN.	Net Explosive Weight (NEW) in lbs.	t (NEW) in lbs. =>	3.50	Unit Concentration (UC):	9.348E-05	9.348E-05 (g/m³)/(g/s)
		Number of SF6 Leak Rate D	Number of Items = 1 Leak Rate Dilution Factor =>	0.93			
	A Maria (A) (A) (A)	Appropriate Control of the Control		The same of the sa	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration	Average Adjusted Emission Factor (lb/Item)	Average Adjusted Emission Factor (lb/lb NEW)	Emitted (grams/item)	Concentration for One Round (grams/m³)	Emission Rate for One Round (g/sec)
		(mg/m)	j		M	CONC	EN
VOCs							
Dichlorodifluoromethane	3.762E-03	3.762E-03	QN.	QN	ΝĎ	QN	QN
Methyl Chloride	1.594E-03	1.594E-03	QN	QN	ON	QN	QN
Dichlorotetrafluoroethane	4.683E-03	4.683E-03	QN	QN	QN	QN	QN
Vinyl Chloride	5.069E-03	5.069E-03	QN	QN	QN	QN	QN
1,3-Butadiene	1.790E-03	1.790E-03	QN	QN	QN	QN	QN
Methyl Bromide	3.073E-03	3.073E-03	QN	QN	QN	QN	QN
Ethyl Chloride	2.112E-03	2.112E-03	QN	QN	QN	QN	QN
Trichlorofluoromethane	3.934E-03	3.934E-03	QN	QN	QN	GN	QN
1,1-Dichloroethene	9.107E-03	6.696E-03	2.992E-05	8.549E-06	1.357E-02	6.343E-07	6.786E-03
Dichloromethane	2.102E-01	5.722E-03	2.538E-03	7.251E-04	1.151E+00	5.381E-05	5.756E-01
3-Chloropropene	2.754E-03	2.754E-03	QN	QN	QN	QN	QN
1,1,2-Trichloro-1,2,2-triffuoroethane	4.799E-03	5.750E-03	QN	QN	QN	QN	QN
1,1-Dichloroethane	3.159E-03	3.159E-03	QN	QN	QN	QN	ON
cis-1,2-Dichloroethene	3.295E-03	3.295E-03	QN	QN	QN	QN	QN
Trichloromethane	4.099E-03	4.099E-03	QN	QN	ND	QN	QN
1,2-Dichloroethane	3.443E-03	3.443E-03	QN	QN	ND	QN	QN QD
1,1,1-Trichloroethane	3.272E-02	1.095E-01	QN ON	Q	QN	Q	Q
Benzene	5.900E-02	2.329E-03	7.322E-04	2.092E-04	3.321E-01	1.552E-05	1.661E-01
Carbon Tetrachloride	4.529E-03	4.529E-03	QN	QN	QN	QN	QN
1,2-Dichloropropane	3.419E-03	3.419E-03	S	QN	QN	QN	QN
Trichloroethene	3.866E-03	3.866E-03	QN	QN	QN	QN	QN
cls-1,3-Dichloropropene	3.360E-03	3.360E-03	QN	QN	QN	QN	ND
trans-1,3-Dichloropropene	2.860E-03	2.860E-03	QN	QN	QN	QN	DN
1,1,2-Trichloroethane	3.877E-03	3.877E-03	QN	QN	ON	QN	QN
Toluene	6.492E-03	3.610E-03	3.577E-05	1.022E-05	1.622E-02	7.583E-07	8.112E-03
1,2-Dibromoethane	5.844E-03		ND	QN	ON	2	S
Tetrachloroethene	4.475E-03	4.475E-03	QN	ΩN	ΩN	Q	ΩN

1/16/01

Table B-32: Air Modeling Output Data for Volatile Organic Compounds - 100 meter location

	155mm prope	ropelling charge DODI	Iling charge M3A1 (zone 3), M199 cannon DODIC: D540	99 cannon	No. of rounds (1) release duration (t):	1 2	1 rounds 2 seconds
	θN 	Net Explosive Weight (NEW) in Ibs. Number of Items = 1 SF6 Leak Rate Dilution Factor	ve Weight (NEW) in lbs. => Number of Items = 1 ak Rate Dilution Factor =>	3.50 0.93	Unit Concentration (UC):	9.348E-05	9.348E-05 (g/m³)/(g/s)
	3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	White States	with filling well keepings	The state of the s	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration	Measured Background	Average Adjusted Emission Factor	Average Adjusted Emission Factor	Emitted (grams/Item)	Concentration for One Round (grams/m³)	Emission Kate for One Round (g/sec)
	(mg/m ₃)	Concentration (mg/m³)	(ib/item) EF	(Ib/Ib NEW)	Σ	CONC	ER,
Chlorobenzene	2,305E-04	2,305E-04	QN	QN	QV	QN	ΩN
Ethylbenzene	2.344E-03	2.344E-03	QN	QN	QN	QN	QN
m&p-Xylene	2.257E-03	2.257E-03	ON	QN	ON	QN	Q
Styrene	2.641E-03	2.641E-03	QN	QN	QN	ND	QN
1,1,2,2-Tefrachloroethane	4.466E-03	4.466E-03	QN	QN	ON	ND	QN
o-Xylene	2.474E-03	2.474E-03	Q	QN	QN	QN	S
4-Ethyltoluene	2.214E-03	2.214E-03	QN	ND	QN	QN	S
1,3,5-Trimethylbenzene	2,460E-03	2.460E-03	QN	QN	QN	ND	QN
1,2,4-Trimethylbenzene	2.312E-03	2.312E-03	Q	Q	ND	ND	ND
Benzyl Chloride	5.076E-03	5.076E-03	Q	QN	QN	QN	QN
m-Dichlorobenzene	3.366E-03	3.366E-03	QN	Q	QN	ND	QN
p-Dichlorobenzene	2.945E-03	2.945E-03	QN	QN	ON	ND	QN
o-Dichlorobenzene	3.606E-03	3.606E-03	S	QN	ON	ND	QN
1,2,4-Trichlorobenzene	4.526E-03	4.526E-03	QN	Q	ND	ND	QN
Hexachlorobutadiene	4.690E-03	4.690E-03	QN	QN	. ON	ND	QN
Methane	2.222E+00	1.364E+00	1.065E-02	3.043E-03	4.831E+00	2.258E-04	2.415E+00
Ethane	6.764E-01	6.764E-01	Q	QN	ND	ND	QN
Ethylene	6.310E-01	6.310E-01	QN	QN	ON	ND	QN
Propane	9.920E-01	9.920E-01	ND	QN	QN	ND	QN
Acetylene	5.858E-01	5.858E-01	QN	QN	QN	ND	ON
Isobutane	1.307E+00	1.307E+00	QN	QN	ND	ND	QN
n-Butane	1.307E+00	1.307E+00	Q	Q	ND	QN	QN
Propylene	9,466E-01	9.466E-01	QN	QN	QN	QN	QN
Footnotes:							

Table B-33; Air Modeling Output Data for Semi-Volatile Organic Compounds - 100 meter location

		, , , , , , , , , , , , , , , , , , , ,	AND AL LAND OF BEAL	200000	(I) abanca jo oly	_	aparios
	radoud unucci		IIII Gilaige Makri (2016 3), Milas callion DODIC: D540	as callion	release duration (t):	- 2	2 seconds
	Ne	Net Explosive Weight	osive Weight (NEW) in lbs. =>	3.50	Unit Concentration (UC):	9.348E-05	9.348E-05 (g/m³)/(g/s)
		Number of SF6 Leak Rate D	Number of Items = 1 Leak Rate Dilution Factor =>	0.93			
		A secondario	Secretary Not the contraction of the second		Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (lb/item) EF	Average Adjusted Emission Factor (lb/lb NEW)	Emitted (grams/Item) M	Concentration for One Round (grams/m³)	Emission Kate for One Round (g/sec) ER,
SVOCs							
n-nitrosod/methylamine	2.829E-03	5.605E-05	Q	QN	QN	QN	QN
bls(2-chloroethyl)ether	2.829E-03	5.605E-05	QN	QN	QN	ND	QN
phenol	2.100E-02		1.722E-04	4.921E-05	7.812E-02	3.651E-06	3.906E-02
2-chlorophenol	2.829E-03	5.605E-05	QN	ON	QN	QN	QN
1,3-dichlorobenzene	2.829E-03	5,605E-05	QN	2	ND	QN	QN
1,4-dichlorobenzene	2.829E-03		QN	Q	ND	QN	QN
1,2-dichlorobenzene	2.829E-03	5.605E-05	QN	S	QN	QN	QN
benzyl alcohol	2.829E-03	5,605E-05	2	Q	QN	Q	Q
bis(2-chlorolsopropyl)ether	2.829E-03	5.605E-05	Q	Q	QN	오	ΩN
2-methylphenol	2.829E-03		Q	Q	QN	QN	S
hexachloroethane	2.829E-03	5.605E-05	Q	오	ON	ON.	QN
n-nitroso-di-n-propylamine	2.829E-03	5.605E-05	QN	QN	QN	QN	QN
4-methylphenol	2.829E-03	5.605E-05	QN	QN	QN	QN	QN
nitrobenzene	2.829E-03	5.605E-05	QN	QN	QN	GN	QN
isophorone	2.829E-03	5.605E-05	QN	QN	QN	QN	QN
2-nitrophenol	2.829E-03		QN	QN	QN	QN	QN
2,4-dimethylphenol	2.829E-03	5.605E-05	S	Q.	QN	S	ON
bis(2-chloroethoxy)methane	2.829E-03	5.605E-05	QN	QN	QN	QN	QN
2,4-dichlorophenol	2.829E-03	5.605E-05	ON	QN	ND	QN	ON
1,2,4-trichlorobenzene	2.829E-03	5.605E-05	QN	QN	ND	QN	QN
naphthalene	3.112E-03	1,366E-04	3.693E-05	1.055E-05	1.675E-02	7.828E-07	8.374E-03
4-chloroaniline	2.829E-02	5.605E-04	QN	QN	QN	QN	ND
hexachlorobutadlene	2.829E-03	5.605E-05	QN	QN	QN	QN	QN
4-chloro-3-methylphenol	2.829E-03		QN	ND	ND	QN	QN
2-methylnaphthalene	2:829E-03	1.694E-04	QN	QN	ND	QN	QN
hexachlorocyclopentadiene	2.829E-03	5.605E-05	QN	QN	QN	QN	QN
2,4,6-trichlorophenol	2.829E-03	5.605E-05	QN	NO.	QN	QN	QQ

Table B-33: Air Modeling Output Data for Semi-Volatile Organic Compounds - 100 meter location

	155mm p	ropelling charge DODI	155mm propelling charge M3A1 (zone 3), M199 cannon DODIC: D540	99 cannon	No. of rounds (I)	1	1 rounds
	Ne	Net Explosive Weight (NEW) in Ibs. Number of Items = 1 SF6 Leak Rate Dilution Factor	ve Weight (NEW) in lbs. => Number of Items = 1 ak Rate Dilution Factor =>	3.50 0.93	Unit Concentration (UC):	9.348E-05	9.348E-05 (g/m³)/(g/s)
		Last kies filtliff ich ilreuni			Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (lb/ltem) EF	Average Adjusted Emission Factor (lb/lb NEW)	Emitted (grams/item) M	Concentration for One Round (grams/m³)	Emission Rate for One Round (g/sec) FR,
2,4,5-trichlorophenol	2.829E-03	5.605E-05	QN	QN	CZ	QN CN	2
2-chloronaphthalene	2.829E-03	5.605E-05	S	2	QN	2 2	Q. S.
2-nitroaniline	2.829E-03	5.605E-05	Q	Q.	QN	Q	S
dimethylphthalate	2.829E-03	5.605E-05	QN	QN	ΩN	2	S S
2,6-dinitrotoluene	2.829E-03	5.721E-05	QN	QN	QN	S	QN
3-nitroaniline	5.658E-03	1.121E-04	ON	QN	QV	S	QN
2,4-dinitrophenol	5.658E-03	1.121E-04	QN ·	QN	QN	S	2
dibenzofuran	2.829E-03	7.823E-05	QN	ND	QN	S	2
2,4-dinitrotoluene	2.829E-03	5.605E-05	QN	QN	QN	QN	QN
4-nitrophenol	5.658E-03	1.316E-04	Q	QN	QN	QN	QN
4-chlorophenyl-phenylether	2.829E-03	5.605E-05	QV	QN	QN	Q	QN
diethylphthalate	2.829E-03	5.605E-05	Q	<u>Q</u>	QN	QN	QN
4-mirroaniine 4 6 dinitro 2 mothylahanal	5.658E-03	1.121E-04	QN .	2	QN	QN	QN
n-nitrosodinhenvlamine(1)	2.630E-03	1.121E-04	2 2	2 2	QN	Q	QN
4-bromonhonyl-nhonylothor	2 0205 03	2000E-00	2 5		ON	QN	Q
howahlashassasa	2.029E-U3	5.605E-05	2	QN .	QX	Q	QN
Hexacilloropelizerie	2.829E-U3	5.605E-05	Q	2	QN	QN	QN
pentacniorophenoi	5.658E-03	1.121E-04	2	Q	QN	2	Q
di-n-butyiphthalate	2.829E-03	1.080E-04	QN	QN	GN	QN	QV.
butylbenzylphthalate	2.829E-03	5.605E-05	NO	QN	QN	QN	QN
bis(2-ethylhexyl)phthalate	2.829E-03	5.605E-05	ND	QN	QN	QN	QN
di-n-octylphthalate	2.829E-03	5.605E-05	QN	QN	QN	QN	QN
Footnotes:							

^{&#}x27;ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study) ND = Not Detected

Table B-34: Air Modeling Output Data for Polynuclear Aromatic Hydrocarbons, Dioxins/Furans, Aldehydes, and Acld Gases 100 meter location

					***	*	
	155mm propel	ropelling charge l	Iling charge M3A1 (zone 3), M199 cannon	99 cannon	No. of rounds (I)		rounds
		Maoa	DODIC: D540		release duration (t):	2	seconds
	S	Net Explosive Weight	losive Weight (NEW) in lbs. =>	3.50	Unit Concentration (UC):	9.348E-05	9.348E-05 (g/m³)/(g/s)
			Number of Items = 1				
		SF6 Leak Rate D	Leak Rate Dilution Factor =>	0.93			
		Quipe (IV)	The Hall of the state of the st		Total Mass of Substance	Average Modeled	Substance Emission Rate for
Compound	Measured Actual Concentration	Measured Background	Average Adjusted Emission Factor	Average Adjusted Emission Factor	(grams/Item)	One Round (grams/m³)	One Round (g/sec)
	(mg/m ₃)	Concentration (mg/m³)	(lb/item) EF	(Ib/Ib NEW)	Σ	CONC	ER,
PAHs (TO-13 Method)				•			
acenaphthylene	4.910E-04	1.328E-06	6.076E-06	1.736E-06	2.756E-03	1.288E-07	1.378E-03
acenaphthene	1.507E-04	9.544E-05	6.854E-07	1.958E-07	3.109E-04	1.453E-08	1.554E-04
fluorene	2.571E-04	6.502E-05	2.383E-06	6.810E-07	1.081E-03	5.053E-08	5.405E-04
phenanthrene	3.933E-04	6.428E-05	4.083E-06	1.167E-06	1.852E-03	8.657E-08	9.261E-04
anthracene	4.472E-05	4.197E-06	5.028E-07	1.437E-07	2.281E-04	1.066E-08	1.140E-04
fluoranthene	1.899E-04	7.852E-06	2.259E-06	6.455E-07	1.025E-03	4.790E-08	5.124E-04
pyrene	4.444E-04	6.908E-06	5.429E-06	1.551E-06	2.463E-03	1.151E-07	1.231E-03
benzo(a)anthracene	2.472E-05	1.390E-07	3.051E-07	8.716E-08	1.384E-04	6.468E-09	6.919E-05
chrysene	3.038E-05	3.878E-07	3.722E-07	1.063E-07	1.688E-04	7.891E-09	8.441E-05
benzo(b)fluoranthene	8.760E-05	2.220E-07	1.084E-06	3.098E-07	4.919E-04	2.299E-08	2.459E-04
benzo(k)fluoranthene	5.658E-05	9.826E-08	7.010E-07	2.003E-07	3.179E-04	1.486E-08	1.590E-04
benzo(a)byrene	1.118E-04	8.980E-08	1,386E-06	3.960E-07	6.287E-04	2.939E-08	3.144E-04
indeno(1,2,3-cd)pyrene	1.997E-04	1.659E-07	2.476E-06	7.074E-07	1.123E-03	5,249E-08	5.615E-04
dibenz(a.h)anthracene	6.252E-06	5.605E-08	7,758E-08	2.217E-08	3.519E-05	1.645E-09	1.760E-05
benzo(q,h,l)perylene	3.906E-04	2.408E-07	4.844E-06	1.384E-06	2.197E-03	1.027E-07	1.099E-03
Dioxin/Furan Data							
2378-TCDD	3.445E-10	8.000E-12	QN	QN	ND	QV	QN
12378-PECDD	3.440E-10	9.000E-12	4.157E-12	1.188E-12	1.886E-09	8.814E-14	9.429E-10
123478-HXCDD	4.715E-10	1.050E-11	QN	Q	QN	2	QN
123678-HXCDD	9.690E-10	1.700E-11	1.181E-11	3.375E-12	5.359E-09	2.505E-13	2.679E-09
123789-HXCDD	1,086E-09	1.550E-11	1.328E-11	3.796E-12	6.026E-09	2.816E-13	3.013E-09
1234678-HPCDD	9.763E-09	2.495E-10	1.181E-10	3.373E-11	5.355E-08	2.503E-12	2.677E-08
OCDD	3.881E-08	1.587E-09	4.619E-10	1.320E-10	2.095E-07	9.793E-12	1.048E-07
2378-TCDF	5.095E-10	1.100E-11	QN	QN	QN	Q	Q
12378-PECDF	2.885E-10	1.050E-11	QN	QN	QN	QN	Q
23478-PECDF	1.595E-10	1.550E-11	QN	ON	QN	QV	Q
123478-HXCDF	1.980E-10	2.800E-11	2.110E-12	6.028E-13	9.569E-10	4.473E-14	4.785E-10
123678-HXCDF	1.525E-10	1,450E-11	QN	QV	QN	QN	2
123789-HXCDF	2.730E-10	6.000E-12	QN	QN	QN	QN	2

Table B-34: Air Modeling Output Data for Polynuclear Aromatic Hydrocarbons, Dioxins/Furans, Aldehydes, and Acid Gases

100 Illetel location	101						
	155mm pi	ropelling charge	155mm propelling charge M3A1 (zone 3), M199 cannon	99 cannon	No. of rounds (I)	фт (
		laoa	DODIC: D540		release duration (t):	2	seconds
	Ne	Net Explosive Weigh	plosive Weight (NEW) in lbs. =>	3.50	Unit Concentration (UC):	9.348E-05	9.348E-05 (g/m³)/(g/s)
		Number of Items = 1 SF6 Leak Rate Dilution Factor	Number of Items = 1 ak Rate Dilution Factor =>	0.93			
		K. Sadelilling for the teach	Part of the second		Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration	Measured Background Concentration	Average Adjusted Emission Factor (lb/item)	Average Adjusted Emission Factor	Emitted (grams/item)	Concentration for One Round (grams/m³)	Emission Rate for One Round (g/sec)
	(mg/m²)	(mg/m ₃)	EF	(Ib/Ib NEW)	Σ	CONC	ER,
234678-HXCDF	2.255E-10	1.200E-11	QN	· QN	QN	2	QN
1234678-HPCDF	7.025E-10	7.750E-11	7.756E-12	2,216E-12	3.518E-09	1.644E-13	1.759E-09
1234789-HPCDF	2.635E-10	8.000E-12	ON	QN	ND	QN	QN
OCDF	1.347E-09	1.105E-10	1.534E-11	4.384E-12	6.960E-09	3.253E-13	3.480E-09
Aldehydes							
Formaldehyde	1.228E-02	1.228E-02	QN	Q	ND	QN	QN
Acetaldehyde	1.802E-02	1.802E-02	QN	QN	QN	2	QN
Acetone	2.375E-02	4.751E-02	ON	QN	ND	Q.	QN
Acrolein	2.294E-02	2.294E-02	ON	QN	QN	S	QN
Proprionaldehyde	2.374E-02	2.374E-02	ON	QN	QN	QN	QN
Crotonaldehyde	2.867E-02	2.867E-02	QN	QN	QN	Q.	QN
Butyraidehyde	2.949E-02	2.949E-02	ON	QN	QN	9	QV
Benzaldehyde	4.340E-02	4.340E-02	ON	QN	QN	Q.	QN
Isovaleraldehyde	3.523E-02	3.523E-02	QN	QN	QN	QV	QN
Valeraldehyde	3.523E-02	3.523E-02	Q	QN	ON	Q	QN
o,m,p-Tolualdehyde	9.828E-02	9.828E-02	QN	QN	QN	QN	QN
Hexaldehyde	4.097E-02	4.097E-02	ND	QN.	QN	Q	S
2,5-Dimethylbenzaldehyde	4.097E-02	4.097E-02	ND	QN	QN	2	S
Acid gases							
Hydrogen fluoride	1.400E-01	1.400E-01	QN	QN	QN	QV	SO
Hydrogen chloride	1.300E-01	1.300E-01	QN	QN	QN	QN	QN
Hydrogen bromide	1.400E-01	1.400E-01	QN	QN	ND	QN.	QN
Nitric Acid	1.400E-01	1.400E-01	QN	Q.	QN	QN ON	QN
Phosphoric acid	1.400E-01	1.400E-01	QN	QN	ND	QN.	S
Sulfuric Acid	1.400E-01	1.400E-01	ND	QN	ND	QN	ND
Footnotes:	, , ,						

Table B-35: Air Modeling Output Data for Cyanide and Energetics - 100 meter location

	155mm propell	ropeling charge DODI	ling charge M3A1 (zone 3), M199 cannon DODIC: D540	199 cannon	No. of rounds (I) release duration (t):	- 2	1 rounds 2 seconds
	Š	Net Explosive Weigh Number o SF6 Leak Rate D	osive Weight (NEW) in lbs. => Number of Items = 1 Leak Rate Dilution Factor =>	3.50 0.93	Unit Concentration (UC):	9,348E-05	9.348E-05 (g/m³)/(g/s)
		and action	a classical contractions	The state of the s	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (ib/item) EF	Average Adjusted Emission Factor (Ib/Ib NEW)	Emitted (grams/item) M	Concentration for One Round (grams/m³)	Emission Rate for One Round (g/sec) ER,
Particulate Cvanide and HCN			·				
Particulate Cyanide	8.000E-02	8.000E-02	QN	9	QN	QN ON	Q
Hydrogen Cyanide	3.800E-01	8.500E-02	4.716E-03	1.347E-03	2.139E+00	9.998E-05	1.070E+00
Energetics Data							
Nitrobenzene	4.740E-01	2.031E-01	QN	QN	QN	QN	QN
2-Nitrotoluene	4.740E-01	2.031E-01	QN	QN	QN	2	S
3-Nitrotoluene	4.740E-01	2.031E-01	QN	QN	QN	QN	9
4-Nitrotoluene	4.740E-01	2.031E-01	QN	QN	QN	QN	QV
Nitroglycerine	4.740E-01	2.031E-01	QN	Q	ND	ND.	QN
1,3-Dinitrobenzene	4.740E-01	2.031E-01	Q	Q	QN	ND	QN
2,6-Dinitrotoluene	4.740E-01	2.031E-01	QN	Q	QN	ND	QN
2,4-Dinitrotoluene	4.740E-01	2.031E-01	QN	QN	QN	QN	Q
1,3,5-Trinitrobenzene	4.740E-01	2.031E-01	QN	QN	QN	QN	QN
2,4,6-Trinitrotoluene	4.740E-01	2.031E-01	QN	QN	QN	QN	Q
RDX	4.740E-01	2.031E-01	QN	QN	QN	QN	Q
4-Amino-2,6-Dinitrotoluene	4.740E-01	2.031E-01	QN.	QN	QN	QN	2
2-Amino-4,6-Dinitrotoluene	4.740E-01	2.031E-01	QN	QN	QN	QN	Q
Tetryl	4.740E-01	2.031E-01	QN	QN	ΩŃ	ND	2
HMX	9.481E-01	4.062E-01	QN	Q	QN	QN	QN
Pentaerythritoltetranitrate	9.481E-01	4.062E-01	QN	QN	QN	QN	QN
Dibutyl phthalate	2.370E+01	1.016E+01	QN	QN	QN	QN	QN
Dioctyl phthalate	2,370E+01	1.016E+01	Q	Q	DN	ND	QN
Diphenylamine	1.185E+01	5.078E+00	QN	QN	ND	ND	QN

Footnotes:

AIR MODELING OUTPUT DATA FOR CHARGE M3A1, FIRED FROM THE M199 CANNON, ZONE 3, 200 METERS DOWNWIND

Table B-36: Air Modeling Output Data for Gases, Metals, and Particulates - 200 meter location

	d Huger	ropelling charge DODI	roomin propeiling charge m3A1 (zone 3), M199 cannon DODIC: D540	as cannon	No. of rounds (I)	- 4	rounds
	Ne	Net Explosive Weight (NEW) in lbs.	t (NEW) in lbs. =>	3.50	Unit Concentration (UC):	4 833F-05	4 833F-05 (a/m³)/(a/e)
		Number				2000	(8/B) // (B/S)
		SF6 Leak Rate Dilution Factor	Ilution Factor =>	0.93			
		SALASTO PITTING	Ancillating werdelightimes		Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration	Measured Background	Average Adjusted Emission Factor	Average Adjusted Emission Factor	Emitted (grams/ltem)	Concentration for One Round (grams/m³)	Emission Rate for One Round (g/sec)
	(mg/m³)	(mg/m³)	(ID/IIGITI) EF	(Ib/Ib NEW)	Σ	CONC	ER,
Gases							
NH3	3.780E+00	NA	4.363E-02	1.246E-02	1.979E+01	2.391E-04	4.947E+00
CO2	6.480E+01	NA	7.479E-01	2.137E-01	3.392E+02	4.099E-03	8.481E+01
00	1.725E+02	NA	1.991E+00	5.688E-01	9.030E+02	1.091E-02	2.258E+02
NOx (as NO)	2.460E-01	NA	QN	QN	QN	QN	QN
CH4	2.178E+00	NA	QN	QN	QN	Q	QN.
802	5.240E-01 ·	NA	QN	QN	QN	Q	Q.
Combined Particulate							
TSP	5.189E+00	5.300E-02	6.374E-02	1.821E-02	2.891E+01	3.493E-04	7.228E+00
PM10	3.692E+00	4.233E-02	4.529E-02	1.294E-02	2.054E+01	2.482E-04	5.135E+00
PM2.5	1.999E+00	2.400E-02	2.451E-02	7.003E-03	1.112E+01	1.343E-04	2.779E+00
Metais							
Antimony	1.840E-04	4.345E-06	QN ·	Q	QN	QN.	QN
Arsenic	1.193E-04	3.091E-06	1.442E-06	4.121E-07	6.542E-04	7.904E-09	1.635E-04
Barlum	2.518E-03	3.255E-05	3.085E-05	8.814E-06	1.399E-02	1.691E-07	3.498E-03
Berylllum	7.885E-05	1.649E-06	QN	QN	QN	2	2
Cadmlum	8.713E-05	1.649E-06	1.081E-06	3.089E-07	4.904E-04	5.926E-09	1.226E-04
Chromium	7.007E-04	7,167E-06	8.606E-06	2.459E-06	3.904E-03	4.717E-08	9.760E-04
Cobait	6.461E-05	3,763E-06	7.551E-07	2.157E-07	3.425E-04	4.138E-09	8.563E-05
Copper	6.788E-01	1.159E-03	8.409E-03	2.403E-03	3.814E+00	4.609E-05	9.536E-01
Lead	2.003E-02	6.770E-05	2.478E-04	7.079E-05	1.124E-01	1.358E-06	2,810E-02
Manganese	2.244E-03	3.086E-05	2.747E-05	7.848E-06	1.246E-02	1.505E-07	3.115E-03
Nickei	1.226E-03	1,433E-05	1.504E-05	4.297E-06	6.821E-03	8.242E-08	1.705E-03
Selenium	2.628E-04	5.497E-06	Q	QN	ND	QN	S
Silver	5.445E-05	1.099E-06	6.758E-07	1.931E-07	3.065E-04	3.704E-09	7.663E-05
Thallium	7.885E-05	1.613E-06	Q.	ON .	QN	QN	Q
Zinc	1.456E-01	1.445E-04	1.805E-03	5.159E-04	8.189E-01	9.895E-06	2.047E-01
Footnotes:	;.·						
ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study)	(for additional info	ormation on the	data, refer to the	Firing Point Emiss	ions Study)		
ND = Not Detected				ł			

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Table B-37: Air Modeling Output Data for Volatile Organic Compounds - 200 meter location

	155mm propell	opelling charge I	ing charge M3A1 (zone 3), M199 cannon	99 cannon	No. of rounds (I)		rounds
		DODIC	DODIC: D540		release duration (t):	4	seconds
	Ne	Net Explosive Weight (NEW) in lbs.	(NEW) in ibs. =>	3.50	Unit Concentration (UC):	4.833E-05	4.833E-05 (g/m³)/(g/s)
		Number of SF6 Leak Rate D	Number of Items = 1 Leak Rate Difution Factor =>	0.93			
		The Green	Me alders activities	S. Company of the Control of the Con	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (ib/item) EF	Average Adjusted Emission Factor (ib/lb NEW)	emitted (grams/Item) M	(grams/m³)	One Round (g/sec) ER ₁
VOCs							
Dichlorodifluoromethane	3.762E-03	3.762E-03	QN	QN	ND	QN	QN
Methyl Chloride	1.594E-03	1,594E-03	QN	QN	QN	ON	QN
Dichlorotetrafluoroethane	4.683E-03	4.683E-03	QN	QN	QN	QN	QN
Vinyl Chloride	5.069E-03	5.069E-03	QN	QN	QN .	QN	QN
1,3-Butadlene	1.790E-03	1.790E-03	QN	QN	Q	Q	Q
Methyl Bromide	3.073E-03	3.073E-03	QN	QN	QN	QN	Q
Ethyl Chloride	2.112E-03	2.112E-03	QN	Q	QN	Q	2
Trichlorofluoromethane	3.934E-03	3.934E-03	QN	ND	QN	Q.	2
1,1-Dichloroethene	9.107E-03	6.696E-03	2.992E-05	8.549E-06	1.357E-02	1.640E-07	3.393E-03
Dichloromethane	2.102E-01	5.722E-03	2.538E-03	7.251E-04	1.151E+00	1,391E-05	2.878E-01
3-Chloropropene	2.754E-03	2.754E-03	QN	QN	QN	QN	Q.
1,1,2-Trichloro-1,2,2-trifluoroethane	4.799E-03	5.750E-03	QN	ND	QN	QV	2
1,1-Dichloroethane	3.159E-03	3.159E-03	QN	QN	ND	ND	QN.
cis-1,2-Dichloroethene	3.295E-03	3.295E-03	QN	QN	ŇD	QN	Q
Trichioromethane	4.099E-03	4.099E-03	QN	QN	QN	ON.	<u>Q</u>
1,2-Dichloroethane	3.443E-03	3.443E-03	ON	QN	Q	QN	Q
1,1,1-Trichloroethane	3.272E-02	1.095E-01	Q	Q	QN	Q	Q
Benzene	5.900E-02	2,329E-03	7.322E-04	2.092E-04	3.321E-01	4.013E-06	8,303E-02
Carbon Tetrachloride	4.529E-03	4.529E-03	QN	QN	ON	QN	Q
1,2-Dichloropropane	3.419E-03	3.419E-03	QN	QN	QN	QN	Q
Trichloroethene	3.866E-03	3.866E-03	DN	QN	ND	QV	Q
cis-1,3-Dichloropropene	3.360E-03	3.360E-03	QN	Q.	ND	Q	QN
trans-1,3-Dichloropropene	2.860E-03	2.860E-03	ON	QN	NO	Q	Q
1,1,2-Trichloroethane	3.877E-03	3.877E-03	QN	Q	ND	Q	QN
Toluene	6.492E-03	3.610E-03	3.577E-05	1.022E-05	1.622E-02	1.960E-07	4,056E-03
1,2-Dibromoethane	5.844E-03	5.844E-03	QN	Q	QN	Q	QN
Tetrachloroethene	4.475E-03	4.475E-03	Q	QN	QN	Q	QN

Table B-37: Air Modeling Output Data for Volatile Organic Compounds - 200 meter location

	155mm prope	ropelling charge	lling charge M3A1 (zone 3), M199 cannon DODIC: D540	99 cannon	No. of rounds (I) release duration (t):	1 4	1 rounds 4 seconds
	Ne	Net Explosive Weight (NEW) in ibs. Number of items = 1 SF6 Leak Rate Dilution Factor	/e Weight (NEW) In lbs=> Number of Items = 1 ak Rate Dilution Factor =>	3.50 0.93	Unit Concentration (UC):	4.833E-05	4.833E-05 (g/m³)/(g/s)
		The state of the state of	The property of the second	The state of the s	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration	Measured Background Concentration	Average Adjusted Emission Factor (lb/item)	Average Adjusted Emission Factor	Emitted (grams/item)	Concentration for One Round (grams/m³)	Emission Rate for One Round (g/sec)
	(mg/m³)	(mg/m³)	EF	(Ib/Ib NEW)	Ψ	CONC	ER,
Chlorobenzene	2,305E-04	2.305E-04	QN	QN	QN	QN	S
Ethylbenzene	2.344E-03	2.344E-03	ON.	QN	ON	QN	9
m&p-Xylene	2.257E-03	2.257E-03	QN	QN	ND	QN	QN
Styrene	2.641E-03	2.641E-03	QN	QN.	ON	QN	2
1,1,2,2-Tetrachloroethane	4.466E-03	4.466E-03	QN	QN	QN	QN	9
o-Xylene	2.474E-03	2.474E-03	QN	QN	QN	QN	2
4-Ethyltoluene	2.214E-03	2.214E-03	QN	QN	ND	QV	QN
1,3,5-Trimethylbenzene	2.460E-03	2.460E-03	QN	QN	- QN	9	9
1,2,4-Trimethylbenzene	2.312E-03	2.312E-03	ON.	QN	QN	QV.	S
Benzyl Chloride	5.076E-03	5.076E-03	S	QN	ND	QN	2
m-Dichlorobenzene	3.366E-03	3.366E-03	DN	QN	QN	2	2
p-Dichlorobenzene	2.945E-03	2.945E-03	ON	QN	QN	Q	Q.
o-Dichlorobenzene	3.606E-03	3.606E-03	QN	QN	QN	2	9
1,2,4-Trichlorobenzene	4.526E-03	4.526E-03	QN	QN	QN	QN N	Q
Hexachlorobutadiene	4.690E-03	4.690E-03	QN	2	ON	QN	Q
Methane	2.222E+00	1.364E+00	1.065E-02	3.043E-03	4.831E+00	5.837E-05	1.208E+00
Ethane	6.764E-01	6.764E-01	Q	Q	QN	ND	ND
Ethylene	6.310E-01	6.310E-01	QN	Q	ND	QN	Ñ
Propane	9.920E-01	9.920E-01	QN	Q.	ON	QN	2
Acetylene	5.858E-01	5.858E-01	QN	QN	ON	QN	QN.
Isobutane	1.307E+00	1.307E+00	QN	ON	ON	QN	2
n-Butane	1.307E+00	1.307E+00	QN	ON	QN	QN	2
Propylene	9.466E-01	9.466E-01	ND	QN	ND	QN	2
Footnotes:							

Table B-38: Air Modeling Output Data for Semi-Volatile Organic Compounds - 200 meter location

Section Properties Proper		466	and the same	ABS 10 1 ACSE		Mary Services And All All		
SF6 Leak Rate Dilution Factor = 9.850			June Bullinge	(1) TEAD	as callion	rologo duration (f)		rounds
Neasured Actual Neasured Near Near Near Near Near Near Near Near			1000	C: D340		release duration (t):	4	seconds
SF6 Leak Ratio Dilution Factor => 0.93		P	t Explosive Weigh		3.50	Unit Concentration (UC):	4.833E-05	4.833E-05 (g/m³)/(g/s)
Measured Actual Concentration (mg/m³) Measured Actual Concentration (mg/m³) Measured Actual Concentration (mg/m³) Average Adjusted Average Adjusted (mg/m³) Total Mass of Substance Emitted (mg/m³) Total Mass of Substance Emitted (mg/m³) Total Mass of Substance Emitted (mg/m³) Mm					0.93			
Measured Actual Concentration (mg/m³) Measured Actual Background (mg/m³) Average Adjusted Emission Factor (mslom Factor (mg/m³) Average Adjusted Emission Factor (mslom Factor (mg/m³) Emission Factor (mslom Factor (mslom Factor (mslom Factor (mg/m³)) M 2.829E-03 5.605E-05 ND ND ND ND 2.829E-03 5.605E-05 ND ND ND ND <th></th> <th>3.7</th> <th></th> <th>(4.1) (S.C.) (A)(1.3)</th> <th></th> <th>Total Mass of Substance</th> <th>Average Modeled</th> <th>Substance</th>		3.7		(4.1) (S.C.) (A)(1.3)		Total Mass of Substance	Average Modeled	Substance
CHINGTON CHINGTON	Compound	Measured Actual Concentration	Measured Background Concentration	Average Adjusted Emission Factor (lb/item)	Average Adjusted Emission Factor	Emitted (grams/item)	Concentration for One Round (grams/m³)	Emission Rate for One Round (g/sec)
2.829E-03 5.605E-05 ND		(mg/m²)	(mg/m ₃)	Ш	(Ib/Ib NEW)	Σ	CONC	ER,
2,829E-03 5,605E-05 ND ND ND 2,829E-03 5	SVOCs							
2.829E-03 5.605E-05 ND ND ND 2.100E-02 7.102E-03 1.722E-04 4.921E-05 7.812E-02 2.209E-03 5.605E-05 ND ND ND 2.829E-03 5.605E-05 ND ND ND 2.829E-	n-nitrosodimethylamine	2.829E-03		ΩN	QN	QN	QN	QN
2.10E-02 7.12E-03 1.722E-04 4.921E-05 7.812E-02 2.829E-03 5.605E-05 ND ND ND 2.829E-03	bis(2-chloroethyl)ether	2.829E-03	5.605E-05	QN	QN	QN	Q	QN
2.829E-03 5.605E-05 ND ND ND 2.829E-03 5	phenol	2.100E-02	7.120E-03	1.722E-04	4.921E-05	7.812E-02	9.439E-07	1.953E-02
2.829E-03 5.605E-05 ND ND ND 2.829E-03 5.604E-05 ND ND ND 2.829E-03 5.605E-05 ND ND ND 2.829E-03 5	2-chlorophenol	2.829E-03	5,605E-05	QN	QN	QN	QN	QN
2.829E-03 5.664E-05 ND ND ND 2.829E-03 5.605E-05 ND ND ND 4 2.829E-03 5.605E-05 ND ND ND 5.829E-03 5.605E-05 ND ND ND ND 6 2.829E-03 5.605E-05 ND ND ND 2.829E-03 5.605E-05 ND ND ND	1,3-dichlorobenzene	2.829E-03	5.605E-05	Q	QN	ND	QN	QN
2.829E-03 5.605E-05 ND ND ND 4 2.829E-03 5.605E-05 ND ND ND 8 2.829E-03 5.605E-05 ND ND ND 9 2.829E-03 5.605E-05 ND ND ND 1 2.829E-03 5.605E-05 ND ND ND 2 2.829E-03 5.605E-05 ND ND ND 2 2.829E-03 5.605E-05	1,4-dichlorobenzene	2.829E-03	5.664E-05	QN	QN	ON	QN	QN
2.829E-03 5.605E-05 ND ND ND 4 2.829E-03 5.605E-05 ND ND ND 4 2.829E-03 5.605E-05 ND ND ND 5 5.605E-05 ND ND ND ND 6 2.829E-03 5.605E-05 ND ND ND 2.829E-03 5.605E-05 ND ND ND 2.829E-03 5.605E-05 ND ND <t< td=""><td>1,2-dichlorobenzene</td><td>2.829E-03</td><td>5.605E-05</td><td>QN</td><td>· QN</td><td>ON</td><td>QN ON</td><td>QN</td></t<>	1,2-dichlorobenzene	2.829E-03	5.605E-05	QN	· QN	ON	QN ON	QN
2.829E-03 5.605E-05 ND ND ND 2.829E-03 5.605E-05 ND ND ND ND 4 2.829E-03 5.605E-05 ND ND ND ND 2.829E-03 5.605E-05 ND ND ND ND ND 4 2.829E-03 5.605E-05 ND ND ND ND ND 5 2.829E-03 5.605E-05 ND ND ND ND ND 2.829E-03 5.605E-05 ND ND ND ND ND 2.829E-03 5.605E-05	benzył alcohol	2.829E-03	5,605E-05	QN	QN	ON	QN	QN
2.829E-03 5.605E-05 ND ND ND 9 2.829E-03 5.605E-05 ND ND ND 10 2.829E-03 5.605E-05 ND ND ND ND 2.829E-03 5.605E-05 ND ND ND N	bis(2-chloroisopropyl)ether	2.829E-03	5.605E-05	ND	QN	QN	Q	QN
2.829E-03 5.605E-05 ND ND ND 9 2.829E-03 5.605E-05 ND ND ND 9 2.829E-03 5.605E-05 ND ND ND 2.829E-03 5.605E-05 ND ND ND ND 2.8	2-methylphenol	2.829E-03	5.605E-05	QN	QN	QN	Q	QN
2.829E-03 5.605E-05 ND ND ND 9 2.829E-03 5.605E-05 ND ND ND 2.829E-03 5.605E-05 ND ND ND ND 2.	hexachtoroethane	2.829E-03	5.605E-05	QN	QN	QN	QN	QN
2.829E-03 5.605E-05 ND ND ND 2.829E-03 5	n-nitroso-di-n-propylamine	2.829E-03	5.605E-05	QN	QN	ON	QV	QN
2.829E-03 5.605E-05 ND ND ND 2.829E-03 5.605E-05 ND ND ND 2.829E-03 3.600E-04 ND ND ND 2.829E-03 5.605E-05 ND ND ND	4-methylphenol	2.829E-03	5.605E-05	Q	QN	ON	QN	QV
2.829E-03 5.605E-05 ND ND ND 2.829E-03 3.600E-04 ND ND ND 2.829E-03 5.605E-05 ND ND ND	nitrobenzene	2.829E-03	5.605E-05	9	QN	QN	QN	QN
2.829E-03 3.600E-04 ND ND ND 2.829E-03 5.605E-05 ND ND ND	Isophorone	2.829E-03	5.605E-05	9	Q	QN	QN	QN
2.829E-03 5.605E-05 ND ND ND 2.829E-03 5.605E-04 3.693E-05 1.055E-05 1.675E-02 2.829E-03 5.605E-04 ND ND ND 2.829E-03 5.605E-05 ND ND ND	2-nitrophenol	2.829E-03	3.660E-04	Q	2	QN	QN	QN
ane 2.829E-03 5.605E-05 ND ND ND 2.829E-03 5.605E-05 ND ND ND ND 2.829E-03 5.605E-05 ND ND ND ND 2.829E-03 5.605E-04 ND ND ND ND 2.829E-03 5.605E-05 ND ND ND ND	2,4-dimethylphenol	2.829E-03	5.605E-05	9	2	QV	QN.	ON
2.829E-03 5.605E-05 ND ND ND 2.829E-03 5.605E-05 ND ND ND 3.112E-03 1.366E-04 3.693E-05 1.055E-05 1.675E-02 2.829E-02 5.605E-04 ND ND ND 2.829E-03 5.605E-05 ND ND ND 2.829E-03 1.694E-04 ND ND ND 2.829E-03 5.605E-05 ND ND ND 2.829E-03 5.605E-05 ND ND ND 2.829E-03 5.605E-05 ND ND ND	bis(2-chloroethoxy)methane	2.829E-03	5.605E-05	2	2	QN	QN	QN
2.829E-03 5.605E-05 ND ND ND 3.112E-03 1.366E-04 3.693E-05 1.055E-05 1.675E-02 2.829E-02 5.605E-04 ND ND ND 2.829E-03 5.605E-05 ND ND ND 2.829E-03 5.605E-05 ND ND ND 3.605E-05 ND ND ND ND 3.829E-03 5.605E-05 ND ND ND 3.829E-03 5.605E-05 ND ND ND 3.829E-03 5.605E-05 ND ND ND	2,4-dichlorophenol	2.829E-03	5.605E-05	2	2	ND	QN	QN
3.112E-03 1.366E-04 3.693E-05 1.055E-05 1.675E-02 2.829E-02 5.605E-04 ND ND ND 2.829E-03 5.605E-05 ND ND ND 2.829E-03 5.605E-05 ND ND ND 3.829E-03 1.694E-04 ND ND ND 3.829E-03 5.605E-05 ND ND ND 2.829E-03 5.605E-05 ND ND ND	1,2,4-trichlorobenzene	2.829E-03	5.605E-05	2	Q	QN	QN	QN
2.829E-02 5.605E-04 ND ND ND 2.829E-03 5.605E-05 ND ND ND 2.829E-03 5.605E-05 ND ND ND 2.829E-03 1.694E-04 ND ND ND nn 2.829E-03 5.605E-05 ND ND ND 2.829E-03 5.605E-05 ND ND ND	naphthalene	3.112E-03	1.366E-04	3.693E-05	1.055E-05	1.675E-02	2.024E-07	4.187E-03
2.829E-03 5.605E-05 ND ND ND 2.829E-03 5.605E-05 ND ND ND 2.829E-03 1.694E-04 ND ND ND 3.829E-03 5.605E-05 ND ND ND 2.829E-03 5.605E-05 ND ND ND	4-chloroaniline	2.829E-02	5.605E-04	Q	QN	QN	QN	QN
2.829E-03 5.605E-05 ND ND ND 2.829E-03 1.694E-04 ND ND ND sne 2.829E-03 5.605E-05 ND ND ND 2.829E-03 5.605E-05 ND ND ND	hexachlorobutadiene	2.829E-03	5.605E-05	Q	QN	ON	QN	QN
2:829E-03 1.694E-04 ND ND ND 3dlene 2:829E-03 5:605E-05 ND ND ND 2:829E-03 5:605E-05 ND ND ND	4-chloro-3-methylphenol	2.829E-03	5.605E-05	Q	2	ND	QN	QN
adlene 2.829E-03 5.605E-05 ND ND ND ND 2.829E-03 5.605E-05 ND ND ND	2-methylnaphthalene	2.829E-03	1.694E-04	Q	2	QN	QN	QN
2.829E-03 5.605E-05 ND ND ND	hexachlorocyclopentadiene	2.829E-03	5.605E-05	Q	2	QN.	DN	QN
	2,4,6-trichlorophenol	2.829E-03	5.605E-05	2	2	QN	QN	ND

Table B-38: Air Modeling Output Data for Semi-Volatile Organic Compounds - 200 meter location

	155mm propel	ropelling charge DODI	ling charge M3A1 (zone 3), M199 cannon DODIC: D540	99 cannon	No. of rounds (I) release duration (t):	L 4	rounds seconds
	Ν.	Net Explosive Weigh Number o SF6 Leak Rate D	losive Weight (NEW) in ibs. => Number of items = 1 Leak Rate Dilution Factor =>	3.50 0.93	Unit Concentration (UC):	4.833E-05	4.833E-05 (g/m³)/(g/s)
	TO SOLVE THE WAY	DANIEL SUSTAINE	SECTION OF BURGIOUS F	No. of the last of	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (Ib/Item) EF	Average Adjusted Emission Factor (lb/lb NEW)	Emitted (grams/ltem) M	Concentration for One Round (grams/m³) CONC	Emission Rate for One Round (g/sec) ER,
2,4,5-trichlorophenol	2.829E-03	5.605E-05	QN	QN	QN	QN	QN
2-chloronaphthalene	2.829E-03	5.605E-05	Q	QN	QN	QN	QN
2-nitroaniline	2.829E-03	5.605E-05	QN	QN	QN	S	Q
dimethylphthalate	2.829E-03	5.605E-05	QN	QN	QN	QN	QN
2,6-dinitrotoluene	2.829E-03	5.721E-05	QN	QN	QN	QN	QN.
3-nitroaniline	5.658E-03	1.121E-04	QN	QN	ON	QV	Q
2,4-dinitrophenol	5.658E-03	1.121E-04	QN	QN	QN	QN	QN
dibenzofuran	2.829E-03	7.823E-05	QN	QN	ON	QN	QN
2,4-dinitrotoluene	2.829E-03	5.605E-05	QN	QN	ON	QN	Q.
4-nitrophenol	5.658E-03	1.316E-04	QN	QN	QN	QN	Q
4-chlorophenyl-phenylether	2.829E-03	5.605E-05	QN	QN	QN	QN	QN
diethyiphthalate	2.829E-03	5.605E-05	ND	QN	QN	QN	S
4-nitroanIllne	5.658E-03	1.121E-04	QN	QN	GN	QN	S
4,6-dinitro-2-methylphenol	5.658E-03	1.121E-04	QN	QN	ND	QN	QN
n-nitrosodiphenylamine(1)	2.829E-03	5,605E-05	QN	QN	ON	QN	QN
4-bromophenyl-phenylether	2.829E-03	5.605E-05	ON	QN	QN	QN	QN
hexachlorobenzene	2.829E-03	5.605E-05	QN	QN	ND	QN	QN
pentachlorophenol	5.658E-03	1.121E-04	ON	QN	QN	QN	QN
di-n-butylphthalate	2.829E-03	1.080E-04	ND	QN	ND	QN	QN
butylbenzylphthalate	2.829E-03	5.605E-05	ND	QN	ND	QN	QN
bis(2-ethylhexyl)phthalate	2.829E-03	5.605E-05	DN	QN	ND	QN	ON
di-n-octylphthalate	2.829E-03	5.605E-05	ND	QN	ND	QN	QN
Footnotes:							

Table B-39: Air Modeling Output Data for Polynuclear Aromatic Hydrocarbons, Dioxins/Furans, Aldehydes, and Acid Gases 200 meter location

	155mm p	ropelling charge	155mm propelling charge M3A1 (zone 3), M199 cannon	99 cannon	No. of rounds (I)	1	rounds
		laoa	DODIC: D540		release duration (t):	4	seconds
	Ne	Net Explosive Weigh	osive Weight (NEW) in lbs. =>	3.50	Unit Concentration (UC):	4.833E-05	4.833E-05 (g/m³)/(g/s)
		SF6 Leak Rate L	Leak Rate Dilution Factor =>	0.93			
		Physical Prints	Went first to be the second of the second	A STATE OF THE STA	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (lb/item) EF	Average Adjusted Emission Factor (Ib/Ib NEW)	(grams/item)	Concentration for One Round (grams/m³)	Emission Kate for One Round (g/sec) ER ₁
PAHs (TO-13 Method)				•			
acenaphthylene	4.910E-04	1.328E-06	6.076E-06	1.736E-06	2.756E-03	3.330E-08	6.890E-04
acenaphthene	1.507E-04	9.544E-05	6.854E-07	1.958E-07	3.109E-04	3.756E-09	7,772E-05
fluorene	2.571E-04	6.502E-05	2.383E-06	6.810E-07	1.081E-03	1.306E-08	2.703E-04
phenanthrene	3.933E-04	6.428E-05	4.083E-06	1.167E-06	1.852E-03	2.238E-08	4.630E-04
anthracene	4.472E-05	4.197E-06	5.028E-07	1.437E-07	2.281E-04	2.756E-09	5.702E-05
fluoranthene	1.899E-04	7.852E-06	2.259E-06	6.455E-07	1.025E-03	1,238E-08	2.562E-04
pyrene	4,444E-04	6.908E-06	5.429E-06	1.551E-06	2.463E-03	2.975E-08	6.157E-04
benzo(a)anthracene	2.472E-05	1.390E-07	3.051E-07	8.716E-08	1.384E-04	1.672E-09	3.459E-05
chrysene	3.038E-05	3.878E-07	3.722E-07	1.063E-07	1.688E-04	2.040E-09	4.221E-05
benzo(b)fluoranthene	8.760E-05	2.220E-07	1.084E-06	3.098E-07	4.919E-04	5.943E-09	1,230E-04
benzo(k)fluoranthene	5.658E-05	9.826E-08	7.010E-07	2.003E-07	3.179E-04	3.842E-09	7.949E-05
benzo(a)pyrene	1.118E-04	8.980E-08	1.386E-06	3.960E-07	6.287E-04	7.597E-09	1.572E-04
indeno(1,2,3-cd)pyrene	1.997E-04		2.476E-06	7.074E-07	1.123E-03	1.357E-08	2.807E-04
dibenz(a,h)anthracene	6.252E-06	5.605E-08	7.758E-08	2.217E-08	3.519E-05	4.252E-10	8.798E-06
benzo(g,h,l)perylene	3.906E-04	2.408E-07	4.844E-06	1,384E-06	2.197E-03	2.655E-08	5.493E-04
Dioxin/Furan Data							
2378-TCDD	3.445E-10	8.000E-12	Q	Q	QN	QN	QN
12378-PECDD	3.440E-10	9.000E-12	4.157E-12	1.188E-12	1.886E-09	2.278E-14	4.714E-10
123478-HXCDD	4.715E-10	1.050E-11	ON THE	ND CO	ON Control	ND ND	ND 4 2407 99
1230/0-HACUU	8.090E-10	1.7000-11	1,10101	0,0705-12	9.339E-09	7 0045 44	1.3405-09
123/89-HXCDD	1.086E-09		1.328E-11	3.790E-12	6.026E-09	/.281E-14	1.506E-09
1234678-HPCDD	9.763E-09	2.495E-10	1.181E-10	3.373E-11	5.355E-08	6.470E-13	1.339E-08
ocop	3.881E-08	1.587E-09	4.619E-10	1.320E-10	2.095E-07	2.532E-12	5,238E-08
2378-TCDF	5.095E-10	1.100E-11	QV	2	QN	2	Q.
12378-PECDF	2.885E-10	1.050E-11	QN	QN	QN	QN	ON
23478-PECDF	1.595E-10	1,550E-11	ᄝ	2	QN	Q	Q
123478-HXCDF	1.980Ё-10	2.800E-11	2.110E-12	6.028E-13	9.569E-10	1.156E-14	2.392E-10
123678-HXCDF	1.525E-10	1.450E-11	QN	QN	QN	ON	QN
123789-HXCDF	2.730E-10	6.000E-12	S	2	QN	QN.	Q

Table B-39: Air Modeling Output Data for Polynuclear Aromatic Hydrocarbons, Dioxins/Furans, Aldehydes, and Acid Gases 200 meter location

				<u> </u>			
	155mm pi	ropelling charge	155mm propelling charge M3A1 (zone 3), M199 cannon	99 cannon	No. of rounds (I)	-	rounds
		DOD	DODIC: D540		release duration (t):	4	4 seconds
	Ne	Net Explosive Weigh	plosive Weight (NEW) in lbs. =>	3.50	Unit Concentration (UC):	4.833E-05	4.833E-05 (g/m³)/(g/s)
		Number of Items = 1 SF6 Leak Rate Dilution Factor	Number of Items = 1 ak Rate Dilution Factor =>	0.93			
		भारतहरू साताल एक कार्यक्र	STATISTICS.		Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual	Measured Background	Average Adjusted Emission Factor	Average Adjusted	Emitted (grams/item)	Concentration for One Round	Emission Rate for One Round
	(mg/m³)	Concentration (mg/m³)	(lb/item) EF	(Ib/Ib NEW)	Σ	CONC	ER,
234678-HXCDF	2.255E-10	1.200E-11	QN	. QN	QN	9	QN
1234678-HPCDF	7.025E-10	7.750E-11	7.756E-12	2.216E-12	3.518E-09	4.251E-14	8.795E-10
1234789-HPCDF	2.635E-10	8.000E-12	Q	QN	QN	S	QN
OCDF	1.347E-09	1.105E-10	1.534E-11	4.384E-12	6.960E-09	8.410E-14	1.740E-09
Aldehydes							
Formaldehyde	1.228E-02	1.228E-02	Q	QN	QN	Q	QN
Acetaldehyde	1.802E-02	1.802E-02	S	QN	QN	2	QN
Acetone	2.375E-02	4.751E-02	QN	QN	QN	2	QN
Acroleln	2.294E-02	2.294E-02	QN	QN	QN	9	QN
Proprionaldehyde	2.374E-02	2.374E-02	2	QN	QN	ON	Q
Crotonaldehyde	2.867E-02	2.867E-02	2	QN	QN	Q	QN
Butyraldehyde	2.949E-02	2.949E-02	QN	QN	QN	QV	QN
Benzaldehyde	4.340E-02	4.340E-02	Q	QN	QN	9	Q
Isovaleraldehyde	3.523E-02	3.523E-02	ᄝ	QN	QN	QN	QN
Valeraldehyde	3.523E-02	3.523E-02	<u>Q</u>	QN	ND	QN	QN
o,m,p-Tolualdehyde	9.828E-02	9.828E-02	Q	QN	ON	QN	QN
Hexaldehyde	4.097E-02	4.097E-02	2	Q	ND	ND	QN
2,5-Dimethylbenzaldehyde	4.097E-02	4.097E-02	Q	Q	ND	QN	QN
Acid gases							
Hydrogen fluoride	1.400E-01	1.400E-01	QN	QN	QN	QN	QN
Hydrogen chloride	1.300E-01	1.300E-01	S	QN	ON	QN	QN
Hydrogen bromide	1.400E-01	1.400E-01	QV	QN	ND	ND	QN
Nitric Acid	1.400E-01	1.400E-01	QQ	Q	ND	QN	QN
Phosphoric acid	1.400E-01	1.400E-01	Q	QN	ND	ND	QN
Sulfuric Acid	1.400E-01	1.400E-01	QN	QN	ND	ND	QN

Footnotes: ¹ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study) ND = Not Detected

Table B-40; Air Modeling Output Data for Cyanide and Energetics - 200 meter location

	155mm pr	ropelling charge	155mm propelling charge M3A1 (zone 3), M199 cannon กฎณะ กรีสถ	99 cannon	No. of rounds (I)	1	rounds
		ומסמ	C: D340		release duration (t).	.	Seconds
	e Z	Net Explosive Weight (NEW) in Ibs. Number of Items = 1 SF6 Leak Rate Dilution Factor	/e Weight (NEW) in lbs. => Number of Items = 1 sk Rate Dilution Factor =>	3.50 0.93	Unit Concentration (UC):	4.833E-05	4.833E-05 (g/m³)/(g/s)
		Melalane.	Medalinar Languitte	A Control of the state of the s	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration	Measured Background	Average Adjusted Emission Factor	Average Adjusted Emission Factor	Emitted . (grams/Item)	Concentration for One Round (grams/m³)	Emission Rate for One Round (g/sec)
	(mg/m ₃)	(mg/m³)	(IOMETH) EF	(Ib/Ib NEW)	Σ	CONC	ER,
Particulate Cyanide and HCN				•			
Particulate Cyanide	8.000E-02	8.000E-02	QN	QN	QN	ND	QN
Hydrogen Cyanide	3.800E-01	8.500E-02	4.716E-03	1.347E-03	2.139E+00	2.584E-05	5.348E-01
Energetics Data							
Nitrobenzene	4.740E-01	2.031E-01	QN	QN	ND	QN	QN
2-Nitrotoluene	4.740E-01	2.031E-01	QN	QN	ON	ND	QN
3-Nitrotoluene	4.740E-01	2.031E-01	QN	QN	ON	ND	QN
4-Nitrotoluene	4.740E-01	2.031E-01	QN	QN	ND	QN	Q
Nitroglycerine	4.740E-01	2.031E-01	QN	QN	ON	ND	QN
1,3-Dinitrobenzene	4.740E-01	2.031E-01	QN	ND	QN	QN	QN
2,6-Dinitrotoluene	4.740E-01	2.031E-01	QN	QN	QN	ON	QN
2,4-Dinitrotoluene	4.740E-01	2.031E-01	QN	QN	DN	ND	QN
1,3,5-Trinltrobenzene	4.740E-01	2.031E-01	2	Q	QN	2	Ω
2,4,6-Trinitrotoluene	4.740E-01	2.031E-01	Q	Q	QN	Q	2
RDX	4.740E-01	2.031E-01	QN	QN	QN	QN	Q
4-Amino-2,6-Dinitrotoluene	4.740E-01	2.031E-01	QN	ND	ND	ON	QN
2-Amino-4,6-Dinitrotoluene	4.740E-01	2.031E-01	QN	QN	QN	QN	QN
Tetryl	4.740E-01	2.031E-01	QN	QN	QN	ND	QN
HMX	9.481E-01	4.062E-01	QN	QN	QN	QN	QN
Pentaerythritoltetranitrate	9.481E-01	4.062E-01	QN	QN	QN	ON	QN
Dibutyi phthalate	2.370E+01	1.016E+01	QN	QN	ON	QN	ON
Dioctyl phthalate	2.370E+01	1.016E+01	QN	QN	QN	ΩN	QN
Diphenylamine	1.185E+01	5.078E+00	ND	ND	ND	QN	Q.

^{&#}x27;ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study)
ND = Not Detected

Footnotes:

AIR MODELING OUTPUT DATA FOR CHARGE M3A1, FIRED FROM THE M284 CANNON, ZONE 3, 100 METERS DOWNWIND

Table B-41: Air Modeling Output Data for Gases, Metals, and Particulates - 100 meter location

	155mm p	ropelling charge	155mm propelling charge M3A1 (zone 3), M284 cannon	84 cannon	No. of rounds (1)		rounds
		ndoa	DODIC: D540		release duration (t):	. 2	
	θN	Net Explosive Weight (NEW) in Ibs.	t (NEW) in lbs. =>	3.50	Unit Concentration (UC):	9.348E-05	9.348E-05 (g/m³)/(g/s)
		Number of Items = 1 SF6 Leak Rate Dilution Factor	Number of Items = 1 ak Rate Dilution Factor =>	0.932			
	Spiration Section		THE HEALTHANDING	Control of the Contro	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (Ib/Item) EF	Average Adjusted Emission Factor (tb/lb NEW)	Emitted (grams/item) M	Concentration for One Round (grams/m³) CONC	Emission Rate for One Round (g/sec) ER ₁
Gases							
NH3	5.530E+00	NA	6.382E-02	1.824E-02	2.895E+01	1.353E-03	1.447E+01
CO2	6.120E+01	NA	7.063E-01	2.018E-01	3.204E+02	1.497E-02	1.602E+02
00	1.656E+02	NA	1.911E+00	5.461E-01	8.669E+02	4.052E-02	4.335E+02
NOx (as NO)	2.952E+00	NA	3.407E-02	9.734E-03	1.545E+01	7.223E-04	7.727E+00
CH4	2.178E+00	NA A	QN	QN	QN	QV.	QN
SO2	5.240E-01	NA	ΩN	QN	QN	Q	QN
Combined Particulate							
TSP	5.510E+00	5.300E-02	6.758E-02	1.931E-02	3.065E+01	1.433E-03	1.533E+01
PM10	4.875E+00	4.233E-02	5.984E-02	1.710E-02	2.714E+01	1,269E-03	1.357E+01
PM2.5	2.731E+00	2.400E-02	3.352E-02	9.578E-03	1.520E+01	7.107E-04	7.602E+00
Metals							
Antimony	1.872E-04	4.345E-06	QN	QN	QN	QN	QN
Arsenic	1.895E-04	3.091E-06	2.308E-06	6.594E-07	1.047E-03	4,893E-08	5.234E-04
Barium	4.346E-03	3.255E-05	5.342E-05	1.526E-05	2.423E-02	1.133E-06	1.212E-02
Beryllium	8.024E-05	1.649E-06	QN	QN	QN	QN	QN
Cadmium	8.024E-05	1.649E-06	QN	QN	QN	QN	QN
Chromium	4.012E-04	7.167E-06	4.879E-06	1.394E-06	2.213E-03	1.034E-07	1.107E-03
Cobalt	6.352E-05	3.763E-06	7.400E-07	2.114E-07	3.357E-04	1,569E-08	1.678E-04
Copper	2.129E-01	1.159E-03	2.622E-03	7.490E-04	1.189E+00	5.558E-05	5.946E-01
Lead	1.527E-02	6.770E-05	1.882E-04	5.378E-05	8.538E-02	3.991E-06	4.269E-02
Manganese	1.337E-03	3.086E-05	1.618E-05	4.622E-06	7.338E-03	3.430E-07	3.669E-03
Nickel	6.241E-04	1.433E-05	7.551E-06	2.157E-06	3,425E-03	1.601E-07	1.712E-03
Selenium	2.675E-04	5.497E-06	QN	QN	QN	S	QV
Silver	5.349E-05	1.099E-06	S	ON	QN	QN	QN
Thalllum	8.024E-05	1.613E-06	QN	QN	ON	QN	QN
Zinc	4.012E-02	1,445E-04	4.950E-04	1.414E-04	2.245E-01	1.049E-05	1.123E-01
Footnotes:	÷						

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Table B-42: Air Modeling Output Data for Volatile Organic Compounds - 100 meter location

					***	4	
	155mm propell	ropelling charge	Ing charge M3A1 (zone 3), M284 cannon	84 cannon	No. of rounds (I)		rounds
		מסם	DODIC: D540		release duration (t):	2	seconds
	Š	Net Explosive Weight (NEW) in ibs.	t (NEW) in lbs. =>	3.50	Unit Concentration (UC):	9.348E-05	9.348E-05 (g/m³)/(g/s)
		Number of SF6 Leak Rate D	Leak Rate Dilution Factor =>	0.932			
-			Colabbasconstitution		Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration	Measured Background Concentration	Average Adjusted Emission Factor (lb/item)	Average Adjusted Emission Factor	Emitted (grams/tem)	Concentration for One Round (grams/m³)	Emission Rate for One Round (g/sec)
	(mg/m _°)	(mg/m ₃)	EF	(ib/ib NEW)	M	CONC	ER,
VOCs							
Dichlorodifluoromethane	3.762E-03	3.762E-03	QN	QN	QN	ND	QN
Methyl Chloride	1.594E-03	1.594E-03	QN	QN	QN	ND	QN
Dichlorotetrafluoroethane	4.683E-03	4.683E-03	Q	QN	QN	ND	QN
Vinyi Chloride	5.069E-03	5.069E-03	QN	QN	ON	ND	QN
1,3-Butadiene	1.790E-03	1.790E-03	QN	QN	QN	QN	QN
Methyl Bromide	3.073E-03	3.073E-03	ON	QN	ND	QN .	QN
Ethyl Chloride	2.112E-03	2.112E-03	QN	QN	ND	QN	Q
Trichlorofluoromethane	3.934E-03	3.934E-03	QN	QN	ND	ON	2
1,1-Dichloroethene	9.135E-03	6.696E-03	3.021E-05	8.632E-06	1.370E-02	1.656E-07	3.426E-03
Dichloromethane	1.697E-01	5.722E-03	2.031E-03	5.803E-04	9.213E-01	1.113E-05	2.303E-01
3-Chloropropene	2.754E-03	2.754E-03	QN	QN	QN	ON	QN
1,1,2-Trichioro-1,2,2-trifluoroethane	4.767E-03	5.750E-03	QN	QN	QN	ND	QN
1,1-Dichloroethane	3.159E-03	3.159E-03	QN	QN	QN	ON	QN
cls-1,2-Dichloroethene	3.295E-03	3,295E-03	QN	QN	QN	QN	QN
Trichtoromethane	4.099E-03	4.099E-03	QN	QN	QN	QN	ON
1,2-Dichloroethane	3.443E-03	3.443E-03	QN	QN	QN	ND	QN
1,1,1-Trichloroethane	1.257E-01	1.095E-01	2.011E-04	5.745E-05	9.121E-02	1.102E-06	2.280E-02
Benzene	5.461E-02	2.329E-03	6.763E-04	1.932E-04	3.068E-01	3.706E-06	7.669E-02
Carbon Tetrachloride	4.529E-03	4.529E-03	QN	QN	ND	QN	QN
1,2-Dichloropropane	3.419E-03	3,419E-03	QN	QN	ND	ON	<u>N</u>
Trichloroethene	3.866E-03	3.866E-03	QN	QN	ND	ND	QN
cis-1,3-Dichlaropropene	3.360E-03	3.360E-03	QN	QN	QN	QN	ON
frans-1,3-Dichloropropene	2.860E-03	2.860E-03	ON	ON	ND	GN	QN
1,1,2-Trichloroethane	3.877E-03	3.877E-03	ON	QN	ND	QN	QN
Toluene	7.167E-03	3.610E-03	4.404E-05	1.258E-05	1,998E-02	2.414E-07	4.994E-03
1,2-Dibromoethane	5.844E-03	5.844E-03	QN	2	QN	QN	QN
Tetrachloroethene	4.475E-03	4,475E-03	ND	QN	ND	QN	QN

Table B-42: Air Modeling Output Data for Volatile Organic Compounds - 100 meter location

	155mm prope	opelling charge DODI	elling charge M3A1 (zone 3), M284 cannon DODIC: D540	84 cannon	No. of rounds (!) release duration (t):	1 2	rounds
	Ne	Net Explosive Weight (NEW) in Ibs. Number of Items = 1 SF6 Leak Rate Ollution Factor	/e Weight (NEW) in lbs. => Number of Items = 1 ak Rate Dilution Factor =>	3.50 0.932	Unit Concentration (UC):	9.348E-05	9.348E-05 (g/m³)/(g/s)
					Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (lb/item) EF	Average Adjusted Emission Factor (Ib/Ib NEW)	Emltted (grams/item) M	Concentration for One Round (grams/m³) CONC	Emission Rate for One Round (g/sec) ER,
Chlorobenzene	2.305E-04	2.305E-04	QN	· GN	S	CN	CN
Ethylbenzene	2.344E-03	2.344E-03	Q.	2	NO.	9	Q
m&p-Xylene	2.257E-03	2.257E-03	QN	Q	QN	QN	QN
Styrene	2.641E-03	2.641E-03	QN	QN	QN	9	Ð
1,1,2,2-Tetrachloroethane	4.466E-03	4.466E-03	QN	Q.	QN	QN	9
o-Xylene	2.474E-03	2.474E-03	QN	QN	QN	ND	Q.
4-Ethyltoluene	2.214E-03	2.214E-03	QN	QN	ND	ND	9
1,3,5-Trimethylbenzene	2.460E-03	2.460E-03	S	S	ON	QN	QN
1,2,4-Trimethylbenzene	2.312E-03	2.312E-03	QN	QN N	QN	QN	2
Benzyl Chloride	5.076E-03	5.076E-03	QN	QN	QN	ΩN	QN
m-Dichlorobenzene	3.366E-03	3.366E-03	QN	QV	QN	QN	2
p-Dichlorobenzene	2.945E-03	2.945E-03	QN	QN	QN	2	QN
o-Dichlorobenzene	3.606E-03	3.606E-03	QN	QN	QN	Q	Q
1,2,4-Trichlorobenzene	4.526E-03	4.526E-03	QN	QN	QN	ND	QN
Hexachiorobutadiene	4.690E-03	4.690E-03	Q	QN	ON	ON	QN
Methane	2.130E+00	1.364E+00	9.490E-03	2.712E-03	4.305E+00	5.201E-05	1.076E+00
Ethane	6.764E-01	6.764E-01	QN	QN	QN	2	QN
Ethylene	6.310E-01	6.310E-01	QN	QN	QN	ON	QN
Propane	9.920E-01	9.920E-01	QN	ND	QN	QN.	S
Acetylene	5.858E-01	5.858E-01	Q	QN	QN	QN	QN
Isobutane	1.307E+00	1.307E+00	Q	Q	QN	ON	2
n-Butane	1,307E+00	1.307E+00	QN	ON	QN	QN	Q.
Propylene	9.466E-01	9.466E-01	QN	QN	QN	QN	QN
Footnotes:							

¹ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study) ND = Not Detected

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Table B-43: Air Modeling Output Data for Semi-Volatile Organic Compounds - 100 meter location

	155mm propell	ropelling charge	ing charge M3A1 (zone 3), M284 cannon	84 cannon	No. of rounds (I)	1	rounds
		IDOD	DODIC: D540		release duration (t):	2	seconds
	θN	Net Explosive Weight (NEW) in Ibs.	t (NEW) in ths. =>	3.50	Unit Concentration (UC):	9.348E-05	9.348E-05 (g/m³)/(g/s)
		SF6 Leak Rate L	Leak Rate Dilution Factor =>	0.932			
		MANAGORATION CONTRACTOR	ALL LANGE FOR EASY		Total Mass of Substance	Average Modeled	Substance Emission Data for
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration	Average Adjusted Emission Factor (lb/ltem)	Average Adjusted Emission Factor (Ib/Ib NEW)	(grams/Item)	One Round (grams/m³)	One Round (g/sec)
- JONE		(mgm)	ī		Σ	CONC	בא _י
n-nitrosodimethylamine	2.402E-03	2.446E-03	Q	QN	QN	QN	QN
bis(2-chloroethyl)ether	2.402E-03	2.446E-03	QN	Q	QN	ON	Q
phenol	2.642E-02	1.712E-02	1.151E-04	3,289E-05	5.221E-02	6.309E-07	1.305E-02
2-chlorophenol	2.402E-03	2.446E-03	QN	QN	QN	ON	QN
1,3-dichlorobenzene	2.402E-03	2.446E-03	QN	QN	DN	ON	QN
1,4-dichlorobenzene	2.402E-03	2.446E-03	QN	QN	ON	QN	QN
1,2-dichlorobenzene	2.402E-03	2.446E-03	S	S	QN	QN	QN
benzyl alcohol	2.402E-03	2.446E-03	ND	QN	ND	ON	QN
bis(2-chlorolsopropyl)ether	2.402E-03	2.446E-03	ND	QN	ND	ON	ON
2-methylphenol	2.402E-03	2.446E-03	ND	QN	ND	QN	ON
hexachloroethane	2.402E-03	2.446E-03	ND	QV	ND	ON	ND
n-nitroso-di-n-propylamine	2.402E-03	2,446E-03	QN	QN	. QN	QN	QN
4-methylphenol	2.402E-03	2.446E-03	QN	QN	ND	QN	ON
nitrobenzene	2.402E-03	2.446E-03	S	Q	ND	QN	QN
isophorone	2.402E-03	2.446E-03	ND	QN	ND	QN	ON
2-nitrophenol	2.402E-03	2.446E-03	QN	QN	QN	QN	ND
2,4-dimethylphenol	2.402E-03	2.446E-03	ON	QN	ND	ON	ON
bis(2-chloroethoxy)methane	2.402E-03	2.446E-03	Q	QN	QN	QN	QN
2,4-dichlorophenol	2.402E-03	2,446E-03	Q	Q	ND	QV	QN
1,2,4-trichtorobenzene	2.402E-03	2.446E-03	QN	QN	QN	QN	ON
naphthalene	3.145E-03	2.446E-03	3.894E-05	1.113E-05	1.766E-02	2.134E-07	4.416E-03
4-chloroaniline	2.402E-02	2,446E-02	ON	QN	ND	GN	QN
hexachlorobutadiene	2.402E-03	2.446E-03	QN	QN .	QN	QN .	QN
4-chloro-3-methylphenol	2.402E-03	2,446E-03	QN	ON	ON	QN	QN
2-methylnaphthalene	2.402E-03	2.446E-03	QN	QN	QN	QN	QN
hexachlorocyclopentadlene	2.402É-03	2.446E-03	QN	Q	QN	QN	QN
2,4,6-trichlorophenol	2.402E-03	2.446E-03	2	QN	QN	QN	Q.

Table B-43: Air Modeling Output Data for Semi-Volatile Organic Compounds - 100 meter location

	155mm p	ropelling charge I DODIC	155mm propelling charge M3A1 (zone 3), M284 cannon DODIC: D540	84 cannon	No. of rounds (!)	1 2	rounds
	Ν	Net Explosive Weight (NEW) in lbs. Number of Items = 1 SF6 Leak Rate Dilution Factor	ve Weight (NEW) in lbs. => Number of Items = 1 ak Rate Dilution Factor =>	3.50	Unit Concentration (UC):	9.348E-05	9.348E-05 (g/m³)/(g/s)
		Still Date of the Party of the	CULX SHILL		Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (lb/ltem) EF	Average Adjusted Emission Factor (Ib/Ib NEW)	Emitted (grams/Item) M	Concentration for One Round (grams/m³)	Emission Rate for One Round (g/sec) ER,
2.4.5-trichlorophenol	2.402E-03	2,446E-03	QN	QN	QN	QN	CN
2-chloronaphthalene	2.402E-03	2.446E-03	ΩN	QN	ND	S	QN
2-nitroaniline	2.402E-03	2.446E-03	QN	QN	QN	QN	QN
dimethyiphthalate	2.402E-03	2,446E-03	QN	QN	QN	QN	Q
2,6-dinitrotoluene	2.402E-03	2,446E-03	QN	QN	QN	ON	QN
3-nitroanlline	4.803E-03	4.892E-03	QN	QN	QN	ND	QN
2,4-dinitrophenol	4.803E-03	4.892E-03	QN	QN	QN	QN	QN
dibenzofuran	2.402E-03	2.446E-03	QN	QN	QN	QN.	QN
2,4-dinitrotoluene	2.402E-03	2.446E-03	ND	QN	QN	QN	QN
4-nitrophenol	4.803E-03	4.892E-03	NO NO	QN	QN	QN	QN
4-chlorophenyl-phenylether	2.402E-03	2.446E-03	ND ND	QN	QN	QN	QN
dlethylphthalate	2.402E-03	2.446E-03	ND	QN	QN	ND	QN
4-nitroaniline	4.803E-03	4.892E-03	2	Q	QN	QN	QN
4,6-dinitro-2-methylphenol	4.803E-03	4.892E-03	QN ON	QN	QN	ON	QN
n-nitrosodiphenylamine(1)	2.402E-03	2.446E-03	QN Q	S	QN	ON	QN
4-bromophenyl-phenylether	2.402E-03	2.446E-03	Q	QN	ND	ON	ON
hexachlorobenzene	2.402E-03	2.446E-03	QN	S	ND	QN	QN
pentachtorophenot	4.803E-03	4.892E-03	ND	QN	ON	QN	QN
di-n-butyiphthalate	5.873E-03	2.446E-03	7.273E-05	2.078E-05	3.299E-02	3.986E-07	8.248E-03
butylbenzylphthalate	2.402E-03	2.446E-03	ON	QN	QN	QN	S
bis(2-ethylhexyl)phthalate	7.191E-02	1.027E-01	ND	ND	QN	ON	QN.
di-n-octylphthalate	2.402E-03	2.446E-03	QN	QN	QN	QN	ND
Enothotic:							

Footnotes:

ATC = Aberdeen Test Center (for additional Information on the data, refer to the Firing Point Emissions Study)

ND = Not Detected

Table B-44: Air Modeling Output Data for Polynuclear Aromatic Hydrocarbons, Dioxins/Furans, Aldehydes, and Acid Gases 100 meter location

	155mm prope		ing charge M3A4 (zone 3) M284 canon	94 cannon	(i) about to oN	,	rounds
			DODIC: D540		release duration (t):	. 2	2 seconds
		T to all all all all all all all all all al		0 50	VOID actionage that	30 3496 0	1-11-31
		net Explosive weign Number	osive weignt (NEW) in ibs. => Number of Items = 1	3.50	Onic concentration (OC):	9.340E-U3	9.348E-U3 (g/m²)/(g/s)
		SF6 Leak Rate D	Leak Rate Dilution Factor =>	0.932			
		Section of the second	are officially to a firetaining	A Commence of the Commence of	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (ib/item) EF	Average Adjusted Emission Factor (Ib/Ib NEW)	Emitted (grams/ltem) M	Concentration for One Round (grams/m³)	Emission Kate for One Round (g/sec) ER,
PAHs (TO-13 Method)							
acenaphthylene	5.329E-04	1.027E-05	6.472E-06	1.849E-06	2.936E-03	3.547E-08	7.339E-04
acenaphthene	1.682E-04	3.180E-04	QN	QN	QN	QN	Q
fluorene	2.490E-04	2.275E-04	2.658E-07	7.595E-08	1.206E-04	1.457E-09	3.015E-05
phenanthrene	3.516E-04	1.932E-04	1.961E-06	5.604E-07	8.897E-04	1.075E-08	2.224E-04
anthracene	5.198E-05	7.094E-06	5.558E-07	1.588E-07	2.521E-04	3.046E-09	6.303E-05
fluoranthene	1.712E-04	1.614E-05	1.920E-06	5.486E-07	8.709E-04	1.052E-08	2.177E-04
pyrene	3,254E-04	1.663E-05	3.823E-06	1.092E-06	1.734E-03	2.095E-08	4.335E-04
benzo(a)anthracene	2.751E-05	2.446E-06	3.406E-07	9.732E-08	1.545E-04	1.867E-09	3.863E-05
chrysene	2.751E-05	2.446E-06	3.406E-07	9.732E-08	1.545E-04	1.867E-09	3.863E-05
benzo(b)fluoranthene	7.178E-05	2.446E-06	8.889E-07	2.540E-07	4.032E-04	4.872E-09	1.008E-04
benzo(k)fluoranthene	4.740E-05	2.446E-06	5.870E-07	1.677E-07	2.662E-04	3.217E-09	6.656E-05
benzo(a)pyrene	1.089E-04	2.446E-06	1.349E-06	3.854E-07	6.119E-04	7.393E-09	1.530E-04
indeno(1,2,3-cd)pyrene	1.530E-04	2.935E-06	1.858E-06	5.309E-07	8.428E-04	1.018E-08	2.107E-04
dibenz(a,h)anthracene	5.148E-06	2.446E-06	6.375E-08	1.821E-08	2.892E-05	3.494E-10	7.229E-06
benzo(g,h,i)perylene	2.715E-04	5.626E-06	3.292E-06	9.406E-07	1.493E-03	1.804E-08	3.733E-04
Dioxin/Furan Data							
2378-TCDD	4.245E-10	8.000E-12	Q	Q	QV	Q	Q
12378-PECDD	3.225E-10	9.000E-12	QQ.	2	Q	QN	Q
123478-HXCDD	5.490E-10	1.050E-11	Q	₽	QN	Q.	Q
123678-HXCDD	7.690E-10	1.700E-11	9.312E-12	2.661E-12	4.224E-09	5.104E-14	1.056E-09
123789-HXCDD	8.705E-10	1.550E-11	1.059E-11	3.025E-12	4.802E-09	5.803E-14	1.201E-09
1234678-HPCDD	9.178E-09	2.495E-10	1.106E-10	3.159E-11	5.015E-08	6.059E-13	1.254E-08
OCDD	4.458E-08	1.587E-09	5.324E-10	1.521E-10	2.415E-07	2.918E-12	6.037E-08
2378-TCDF	1,230E-10	1.100E-11	QN	QN	QN	QN	ON
12378-PECDF	3.375E-10	1.050E-11	QN	QN	QN	ND	QN
23478-PECDF	1.950E-10	1.550E-11	QN	QN	QN	QN	QN
123478-HXCDF	1.840É-10	2.800E-11	Q	2	QN	QN	QN
123678-HXCDF	1.795E-10	1.450E-11	Q.	QN.	QN	QN	QN
123789-HXCDF	3.220E-10	6.000E-12	Q	2	QN	<u>Q</u>	QQ.

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Table B-44: Air Modeling Output Data for Polynuclear Aromatic Hydrocarbons, Dioxins/Furans, Aldehydes, and Acid Gases 100 meter location

SUPPORT ISSUE OF	12						
	155mm p	ropelling charge	155mm propelling charge M3A1 (zone 3), M284 cannon	84 cannon	No. of rounds (I)	-	rounds
		laoa	DODIC: D540		release duration (t):	2	seconds
	Ne	Net Explosive Weigh	plosive Weight (NEW) in lbs. =>	3.50	Unit Concentration (UC):	9.348E-05	9.348E-05 (g/m³)/(g/s)
							· !
		Sho Leak Rate Dilution Factor	אותווסנו רמכנסו =>	0.932			
		Section of the section of	Kyre monte va aktionic of		Total Mass of Substance	Average Modeled	Substance
	Measured Actual	Measured	Average Adjusted	Average Adjusted	(grams/item)	Concentration for One Round	Emission Kate tor One Round
Compound	Concentration	Background Concentration	Emission Factor	Emission Factor		(grams/m³)	(aksec)
	(mg/m ₃)	(mg/m³)	EF	(Ib/Ib NEW)	Σ	CONC	ER,
234678-HXCDF	2.640E-10	1.200E-11	QN	· QN	QN	QN	QN.
1234678-HPCDF	7.080E-10	7.750E-11	7.808E-12	2.231E-12	3.541E-09	4.279E-14	8.854E-10
1234789-HPCDF	3.755E-10	8.000E-12	ON	QN	QN	QN	Q.
OCDF	1.436E-09	1.105E-10	1.641E-11	4.690E-12	7.445E-09	8.996E-14	1.861E-09
Aldehydes							
Formaldehyde	1.228E-02	1.228E-02	QN	QN	QN	QN	QN
Acetaldehyde	1.802E-02	1.802E-02	Q	QN	QN	QN	Q
Acetone	3.563E-02	4.751E-02	Q	QN	ND	QN	QN
Acrolein	2.294E-02	2.294E-02	2	QN	DN	QN	2
Proprionaldehyde	2.374E-02	2.374E-02	Q	QN	DN	QN	9
Crotonaldehyde	2.867E-02	2.867E-02	QN	QN	ND	QN	Q.
Butyraldehyde	2.949E-02	2.949E-02	ON	QN	QN	QN	QV
Benzaldehyde	4.340E-02	4.340E-02	QN	QN	QN	9	QN
Isovaleraldehyde	3.523E-02	3.523E-02	QN	QN	ND	QV	Q
Valeraldehyde	3.523E-02	3.523E-02	Q	QN	ND	ND	QN
o,m,p-Tolualdehyde	9.828E-02	9.828E-02	Q.	QN	ND	ND	ON
Hexaldehyde	4.097E-02	4.097E-02	ΩN	Q	ND	ND	QN
2,5-Dimethylbenzaldehyde	4.097E-02	4.097E-02	Q	QN	ND	ND.	QN
Acid gases							
Hydrogen fluoride	1.400E-01	1.400E-01	QN	QN	QN	2	QN
Hydrogen chloride	1.300E-01	1.300E-01	QN	QN	QN	S	Q
Hydrogen bromide	1.400E-01	1.400E-01	ON O	QN	QN	ON.	9
Nitric Acid	2.400E-01	2.200E-01	2.477E-04	7.076E-05	1.123E-01	1.357E-06	2.808E-02
Phosphoric acid	1.400E-01	1.400E-01	QN	Q	ND	ND	QN
Sulfuric Acld	2.950E-01	1.400E-01	3.653E-03	1.044E-03	1.657E+00	2.002E-05	4.142E-01
T. a. A. a. A. a. a.							

ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study)
ND = Not Detected

Table B-45: Air Modeling Output Data for Cyanide and Energetics - 100 meter location

	155mm propel		ling charge M3A1 (zone 3), M284 cannon	84 cannon	No. of rounds (I)	1	rounds
		Idod	DODIC: D540		release duration (t):	8	2 seconds
	N	Net Explosive Weigh	osive Weight (NEW) in lbs. =>	3.50	Unit Concentration (UC):	9.348E-05	9.348E-05 (g/m³)/(g/s)
		Number of SF6 Leak Rate D	Number of Items = 1 Leak Rate Dilution Factor =>	0.932			
				The second secon	Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration	Measured Background Concentration	Average Adjusted Emission Factor (lb/item)	Average Adjusted Emission Factor	Emitted (grams/Item)	Concentration for One Round (grams/m³)	Emission Rate for One Round (g/sec)
	(mg/m²)	(mg/m³)	EF	(ANEMA (I/OI)	W	CONC	ER,
Particulate Cyanide and HCN							
Particulate Cyanide	8.000E-02	8.000E-02	QN	QN	QN	2	Q.
Hydrogen Cyanide	9.000E-01	8,500E-02	1.114E-02	3.184E-03	5.055E+00	6.108E-05	1,264E+00
Energetics Data							
Nitrobenzene	4.713E-01	2.031E-01	QN	ND	ON	QN	QN N
2-Nitrotoluene	4.713E-01	2.031E-01	QN	QN	ON	QN	QN
3-Nitrotoluene	4.713E-01	2.031E-01	QN	QN	ON	ON	QN
4-Nitrotoluene	4.713E-01	2.031E-01	ND	QN	ND	QN	QN
Nitroglycerine	4.713E-01	2.031E-01	ND	S	ND	QN	QN
1,3-Dinitrobenzene	4.713E-01	2.031E-01	ND	Q.	ON	QN	QN
2,6-Dinitrotoluene	4.713E-01	2.031E-01	ND	QN	ON	QN	QN
2,4-Dinitrotoluene	4.713E-01	2.031E-01	QN	ON	ON	ON	QN
1,3,5-Trinitrobenzene	4.713E-01	2.031E-01	QN	QN	QN	QN	ON
2,4,6-Trinitrotoluene	4.713E-01	2.031E-01	ND	QN	ON	ON	QN
RDX	4.713E-01	2.031E-01	ND	ΩN	ND	QN	QN
4-Amino-2,6-Dinitrotoluene	4.713E-01	2.031E-01	QN	ON	QN	QN	Q
2-Amino-4,6-Dinitrotoluene	4.713E-01	2.031E-01	ON	ΩN	ON	QN	QN
Tetryl	4.713E-01	2.031E-01	QN	QN	ON	QN	QN
HMX	9.426E-01	4.062E-01	ND	QN	ND	QN	QN
Pentaerythritoltetranitrate	9,426E-01	4.062E-01	QN	QN	ND	QN	QN
Dibutyl phthalate	2.357E+01	1,016E+01	QN	QV	ND	ON	QN
Dioctyl phthalate	2.357E+01	1.016E+01	9	Q.	ND	QN	ON
Diphenylamine	1.178E+01	5.078E+00	NO.	QN	ND	ND	ON

Footnotes:

¹ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study) ND = Not Detected

AIR MODELING OUTPUT DATA FOR CHARGE M3A1, FIRED FROM THE M284 CANNON, ZONE 3, 200 METERS DOWNWIND

Table B-46: Air Modeling Output Data for Gases, Metals, and Particulates - 200 meter location

	A E E COMPANY	epache sullione	monage ASOM 15 and 1 143 A 143 A 1834 and an Illianous muse as a	A cannon	No of rounds (1)		rounds
		DODI	DODIC: D540		release duration (t):	4	seconds
	SN	Net Explosive Weight (NEW) in lbs.	/e Weight (NEW) in lbs. =>	3.50	Unit Concentration (UC):	4.833E-05	4.833E-05 (g/m³)/(g/s)
		SF6 Leak Rate Dilution Factor	Ilution Factor =>	0.932			
			Mentine years in the March		Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (lb/item) EF	Average Adjusted Emission Factor (Ib/lb NEW)	Emitted (grams/item) M	(grams/m³)	Critission Rate for One Round (g/sec) ER ₁
Gases							
NH3	5.530E+00	ΑN	6.382E-02	1.824E-02	2.895E+01	3.498E-04	7.237E+00
002	6.120E+01	A A	7.063E-01	2.018E-01	3.204E+02	3.871E-03	8.010E+01
00	1.656E+02	NA	1.911E+00	5.461E-01	8.669E+02	1.047E-02	2.167E+02
NOx (as NO)	2.952E+00	NA	3.407E-02	9.734E-03	1.545E+01	1.867E-04	3.863E+00
CH4	2.178E+00	ΑN	QN	QN	QN	QN	ND
802	5.240E-01	NA	ND	QN	ND	QN	9
Combined Particulate							
TSP	5.510E+00	5.300E-02	6.758E-02	1.931E-02	3.065E+01	3.703E-04	7.663E+00
PM10	4.875E+00	4.233E-02	5.984E-02	1.710E-02	2.714E+01	3,279E-04	6.785E+00
PM2.5	2.731E+00	2.400E-02	3.352E-02	9.578E-03	1.520E+01	1.837E-04	3.801E+00
Metals							
Antimony	1.872E-04	4.345E-06	QN	QN	ND	Q	QN
Arsenic	1.895E-04	3.091E-06	2.308E-06	6.594E-07	1,047E-03	1.265E-08	2.617E-04
Barlum	4,346E-03	3.255E-05	5.342E-05	1.526E-05	2.423E-02	2.928E-07	6.058E-03
Beryllium	8.024E-05	1.649E-06	QN	QN	ON	QN	Q
Cadmium	8.024E-05	1.649E-06	ND	QN	QN	Q	QN
Chromium	4.012E-04	7.167E-06	4,879E-06	1.394E-06	2.213E-03	2.674E-08	5.533E-04
Cobalt	6.352E-05	3.763E-06	7.400E-07	2.114E-07	3.357E-04	4.056E-09	8.392E-05
Copper	2.129E-01	1,159E-03	2.622E-03	7.490E-04	1.189E+00	1.437E-05	2.973E-01
Lead	1.527E-02	6.770E-05	1.882E-04	5.378E-05	8.538E-02	1.032E-06	2.134E-02
Manganese	1.337E-03	3.086E-05	1.618E-05	4.622E-06	7.338E-03	8.867E-08	1.835E-03
Nickel	6.241E-04	1.433E-05	7.551E-06	2.157E-06	3.425E-03	4.138E-08	8.562E-04
Selenium	2.675E-04	5.497E-06	QN	QN	QN	QN	QN .
Silver	5.349E-05	1.099E-06	QN	QN	ON	QN	ND
Thallium	8.024E-05	1.613E-06	QN	ON	QN	QN	QN
Zinc	4.012E-02	1.445E-04	4,950E-04	1.414E-04	2.245E-01	2.713E-06	5.613E-02
Footnotes:							

Footnotes:

ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study)
ND = Not Detected

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Table B-47: Air Modeling Output Data for Volatile Organic Compounds - 200 meter location

	155mm propel		ling charge M3A1 (zone 3), M284 cannon	84 cannon	No. of rounds (I)	-	spunos
		DOD	DODIC; D540		release duration (t):	4	seconds
	θN	Net Explosive Weigh	osive Weight (NEW) in lbs. => Number of items = 1	3.50	Unit Concentration (UC):	4.833E-05	4.833E-05 (g/m³)/(g/s)
		SF6 Leak Rate D	Leak Rate Dilution Factor =>	0.932			
	ALL ALL AND		ACCIDITATION COLLECTION OF		Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration	Average Adjusted Emission Factor (lb/ltem)	Average Adjusted Emission Factor (lb/lb NEW)	Emitted (grams/Item)	One Round (grams/m³)	Emission Rate for One Round (g/sec)
		(i		JAI	ONIO	
Dichlorodiffuoromethane	3.762F-03	3.762E-03	S.	QN	QN	GN	CN
Methyl Chloride	1.594E-03	1.594E-03	Q	QN	Q	Q	QN
Dichlorotetrafluoroethane	4.683E-03	4.683E-03	Q	QN	QN	QN	QN
Vinyl Chloride	5.069E-03	5.069E-03	QN	QN	GN	ND	QN
1,3-Butadlene	1.790E-03	1.790E-03	QN	QN	ND	ON	QN
Methyl Bromide	3.073E-03	3.073E-03	Q	S	QN	QN	QN
Ethyl Chloride	2.112E-03	2.112E-03	Q	9	QN	ND	ON.
Trichlorofluoromethane	3.934E-03	3.934E-03	QN	QN.	ND	ND	S
1,1-Dichloroethene	9.135E-03	6.696E-03	3.021E-05	8.632E-06	1.370E-02	1.656E-07	3.426E-03
Dichloromethane	1.697E-01	5.722E-03	2.031E-03	5.803E-04	9.213E-01	1.113E-05	2.303E-01
3-Chloropropene	2.754E-03		QN	QN	GN	. QN	QN
1,1,2-Trichloro-1,2,2-trifluoroethane	4.767E-03	5.750E-03	QN	QN	QN	ND	QN
1,1-Dichtoroethane	3.159E-03		QN	QN	QN	ND	QN
cls-1,2-Dichloroethene	3.295E-03	3.295E-03	QN	QN	QN	ON	QN
Trichloromethane	4.099E-03	4.099E-03	QN	QN	QN	QN	QN
1,2-Dichloroethane	3.443E-03	3.443E-03	QN	QN	ND	ND	ND
1,1,1-Trichloroethane	1.257E-01	1.095E-01	2.011E-04	5.745E-05	9.121E-02	1.102E-06	2.280E-02
Benzene	5.461E-02	2.329E-03	6.763E-04	1.932E-04	3.068E-01	3.706E-06	7.669E-02
Carbon Tetrachloride	4.529E-03	4.529E-03	2	Q	QN	S	QN
1,2-Dichloropropane	3.419E-03	3.419E-03	QN	Q	QN	ND	QN
Trichloroethene	3.866E-03	3.866E-03	QN	Q	QN	ND	QN
cls-1,3-Dichloropropene	3.360E-03	3.360E-03	QN	QN	ND	QN	QN
trans-1,3-Dichloropropene	2.860E-03	2.860E-03	ON	QN	ND	ND	QN
1,1,2-Trichloroethane	3.877E-03	3.877E-03	QN	QN ND	QN	ND	ON
Toluene	7,167E-03	3.610E-03	4.404E-05	1.258E-05	1.998E-02	2.414E-07	4.994E-03
1,2-Dibromoethane	5.844E-03	5.844E-03	QN	Q	QN	ND ND	Q
Tetrachloroethene	4.475E-03	4.475E-03	Q	2	ND ND	ON.	S Q

Table B-47: Air Modeling Output Data for Volatile Organic Compounds - 200 meter location

	155mm pi	opelling charge	155mm propelling charge M3A1 (zone 3), M284 cannon	84 cannon	No. of rounds (I)	1	rounds
		IDOD	DODIC: D540		release duration (t):	4	seconds
	N e	Net Explosive Weigh	plosive Weight (NEW) in lbs. =>	3.50	Unit Concentration (UC):	4.833E-05	4.833E-05 (g/m³)/(g/s)
		Number of Items = 1 SF6 Leak Rate Dilution Factor	Number of Items = 1 ak Rate Dilution Factor =>	0.932			
	The second second	[[[[]]]] ([[]]] [[]] [[]] [[]] [[]] [[]			Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration	Measured Background	Average Adjusted Emission Factor	Average Adjusted Emission Factor	Emitted (grams/Item)	Concentration for One Round (grams/m³)	Emission Rate for One Round (g/sec)
	(mg/m³)	(mg/m³)	EF EF	(Ib/Ib NEW)	M	CONC	ER,
Chlorobenzene	2,305E-04	2.305E-04	QN	QN .	QN	QN	Q
Ethylbenzene	2.344E-03	2.344E-03	QN	QN	ON	QN	QN
m&p-Xylene	2.257E-03	2.257E-03	QN	QN	ND	QN	QN
Styrene	2.641E-03	2.641E-03	QN	QN	QN	QN	QN
1,1,2,2-Tetrachloroethane	4.466E-03	4.466E-03	QN	QN	QN	8	Q
o-Xylene	2.474E-03	2.474E-03	QN	QN	QN	9	Q
4-Ethyltoluene	2.214E-03	2.214E-03	QN	QN	ND	Q	QN
1,3,5-Trimethylbenzene	2.460E-03	2.460E-03	QN	QN	ON	QN	2
1,2,4-Trlmethylbenzene	2.312E-03	2.312E-03	QN	ON	ON	QN	2
Benzyi Chloride	5.076E-03	5.076E-03	ΩN	QN	QN	ON	QN
m-Dichlorobenzene	3.366E-03	3.366E-03	ON.	QN	QN	S	2
p-Dichlorobenzene	2.945E-03	2.945E-03	QN	QN	QN	QV	2
o-Dichlorobenzene	3.606E-03	3.606E-03	QN	ΩN	QN	Q.	9
1,2,4-Trichlorobenzene	4.526E-03	4.526E-03	QN	QN	ND	ON	ND
Hexachlorobutadiene	4.690E-03	4.690E-03	Q	2	ND	QN	QN
Methane	2.130E+00	1.364E+00	9.490E-03	2.712E-03	4.305E+00	5.201E-05	1.076E+00
Ethane	6.764E-01	6.764E-01	QN	QN	QN	QN	QV
Ethylene	6.310E-01	6.310E-01	QN	QN	ND	QN	Q
Propane	9.920E-01	9.920E-01	QN	QN	QN	QV	S
Acetylene	5.858E-01	5.858E-01	ND	QN	. QN	QV.	QN
Isobutane	1.307E+00	1.307E+00	ND	QN	QN	QN	S
n-Butane	1.307E+00	1.307E+00	QN	ON	QN	QN	QN
Propylene	9.466E-01	9.466E-01	ND	QN	QN	QN	QN
Footnotes:							

'ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study)
ND = Not Detected

Table B-48; Air Modeling Output Data for Semi-Volatile Organic Compounds - 200 meter location

	155mm propell		ing charge M3A1 (zone 3), M284 cannon	84 cannon	No. of rounds (I)	1	rounds
	Ne	Net Explosive Weight (NEW) in lbs.	(NEW) in ibs. =>	3.50	Unit Concentration (UC):	4.833E-05	4.833E-05 (g/m³)/(g/s)
		Number	Number of Items = 1				
		SF6 Leak Rate D	Leak Rate Dilution Factor =>	0.932			
					Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (Ib/item) EF	Average Adjusted Emission Factor (Ib/Ib NEW)	(grams/Item)	Concentration to One Round (grams/m³)	One Round (g/sec) ER ₄
SVOCs							
n-nitrosodimethylamine	2.402E-03	2.446E-03	QN	QN	ND	QN	QN
bis(2-chloroethyl)ether	2.402E-03	2.446E-03	QN	QN	QN	QN	QN
phenol	2.642E-02	1.712E-02	1.151E-04	3.289E-05	5.221E-02	6.309E-07	1.305E-02
2-chlorophenol	2.402E-03	2.446E-03	QN	ON	QN	QN	QN
1,3-dichlorobenzene	2.402E-03	2.446E-03	ND	9	ND	QN.	QN
1,4-dichlorobenzene	2.402E-03	2.446E-03	QN	QN	ND	ND	QN
1,2-dichlorobenzene	2.402E-03	2.446E-03	QN	QN	ND	ND	ON
benzyl alcohol	2.402E-03	2.446E-03	QN	Q.	ND	QN	QN
bis(2-chlorolsopropyl)ether	2.402E-03	2.446E-03	QN	QN	QN	QN	QN.
2-methylphenol	2.402E-03	2.446E-03	ΩN	Q	QN	2	QN
hexachloroethane	2.402E-03	2.446E-03	ON	2	ND	QV	QN
n-nitroso-di-n-propylamine	2.402E-03	2.446E-03	ND	Q	QN	ON.	QN
4-methylphenol	2,402E-03	2,446E-03	QN	QN	QN	ON	QN
nitrobenzene	2.402E-03	2.446E-03	QN	QN	QN	QN	QN
isophorone	2.402E-03	2.446E-03	QN	QN	ND	ON	ON
2-nitrophenol	2.402E-03	2.446E-03	ON	QN	QN	QN	QN
2,4-dimethylphenol	2.402E-03	2.446E-03	QN	9	QN	Q	2
bis(2-chloroethoxy)methane	2.402E-03	2.446E-03	QN	Q	QN	QN	QN
2,4-dichlorophenol	2.402E-03	2.446E-03	QN.	2	QN	Q.	NO NO
1,2,4-trichlorobenzene	2.402E-03	2.446E-03	Q.	QN ON	QN	2	ΩN
naphthalene	3.145E-03	2.446E-03	3.894E-05	1.113E-05	1.766E-02	2.134E-07	4.416E-03
4-chloroaniline	2.402E-02	2.446E-02	QN	QN	ND	QN .	QN
hexachlorobutadiene	2.402E-03	2.446E-03	QN	2	QN	<u>Q</u>	QN
4-chloro-3-methylphenol	2.402E-03	2.446E-03	QN	Q.	QN	Q	QN
2-methylnaphthalene	2.402E-03	2.446E-03	QN	2	QN	Q.	N Q
hexachlorocyclopentadlene	2.402E-03	2.446E-03	Q	Q	Q	QN	QN
2,4,6-trichlorophenol	2.402E-03	2,446E-03	S	2	Q	Q.	Q

Table B-48: Air Modeling Output Data for Semi-Volatile Organic Compounds - 200 meter location

	155mm p	ropelling charge DODI	155mm propelling charge M3A1 (zone 3), M284 cannon DODIC: D540	84 cannon	No. of rounds (I) release duration (t):	1	rounds
	e B	Net Explosive Weight (NEW) in lbs. Number of Items = 1 SF6 Leak Rate Dilution Factor	ve Weight (NEW) in Ibs. => Number of Items = 1 ak Rate Dilution Factor =>	3.50 0.932	Unit Concentration (UC):	4.833E-05	4.833E-05 (g/m³)/(g/s)
			Senting water in the		Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (ib/item) EF	Average Adjusted Emission Factor (ib/ib NEW)	Emitted (grams/Item) M	Concentration for One Round (grams/m³)	Emission Kate for One Round (g/sec) ER,
2,4,5-trichlorophenol	2.402E-03	2.446E-03	2	QV	QN	QN	QN
2-chloronaphthalene	2,402E-03	2.446E-03	QN	QN	ON	ΩN	QN
2-nitroaniline	2.402E-03	2.446E-03	QN	QN	ND	QN	QV
dimethylphthalate	2.402E-03	2.446E-03	QN	QN	QN	QN	9
2,6-dinitrotoluene	2.402E-03	2.446E-03	ON	QN	QN	QN	ΩN
3-nitroaniline	4.803E-03	4.892E-03	QN	ON	QN	ON	QN
2,4-dinitrophenol	4.803E-03	4.892E-03	2	DN	QN	QN	QN
dlbenzofuran	2.402E-03	2.446E-03	2	QN	ND	ND	QN
2,4-dinItrotoluene	2.402E-03	2.446E-03	9	QN	QN	ND	ND
4-nitrophenol	4.803E-03	4.892E-03	Q	QN	ND	ON	QN
4-chlorophenyl-phenylether	2.402E-03	2,446E-03	QN	QN	QN	QN	QN
diethylphthalate	2.402E-03	2.446E-03	QN	QN	QN	QN	QN
4-nitroaniline	4.803E-03	4.892E-03	Q	Q	ND	QN	QN
4,6-dinltro-2-methylphenol	4.803E-03	4.892E-03	Q	Q	QN	QN	ND
n-nitrosodiphenylamine(1)	2.402E-03	2.446E-03	QN	QN	QN	QN	QN
4-bromophenyi-phenyiether	2.402E-03	2.446E-03	QV	S	QN	QN	QN
hexachlorobenzene	2.402E-03	2.446E-03	Q	Q.	ON	QN .	QN
pentachlorophenol	4.803E-03	4.892E-03	QN	QN	QN	ΩN	S
di-n-butyiphthalate	5.873E-03	2.446E-03	7.273E-05	2.078E-05	3.299E-02	3.986E-07	8.248E-03
butylbenzylphthalate	2.402E-03	2.446E-03	QN	QN	QN	QN	QN
bis(2-ethylhexyl)phthalate	7.191E-02	1.027E-01	QN	S	ND	QN	QN
di-n-octylphthalate	2.402E-03	2,446E-03	QN	QN	QN	ΩN	QN
Cootnotos:							

Footnotes:

ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study)

ND = Not Detected

Table B-49: Air Modeling Output Data for Polynuclear Aromatic Hydrocarbons, Dioxins/Furans, Aldehydes, and Acid Gases 200 meter location

	155mm pt	ropelling charge	155mm propelling charge M3A1 (zone 3), M284 cannon	84 cannon	No. of rounds (I)	1	rounds
		ומסמ	DODIC: 0540		release duration (t):	4	seconds
	Ne	Net Explosive Weight (NEW) in Ibs.	t (NEW) in lbs. =>	3.50	Unit Concentration (UC):	4.833E-05	4.833E-05 (g/m³)/(g/s)
		Number					
			Leak Rate Dilution Factor =>	0.932			
		Shirle Filling	જીવાના તેમાં તું કાર્યા સામાના મુખ્ય		Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (lb/item) EF	Average Adjusted Emission Factor (tb/lb NEW)	Emitted (grams/item) M	One Round (grams/m³)	Constitution (g/sec) (g/sec) ER,
PAHs (TO-13 Method)				٠			
acenaphthylene	5.329E-04	1.027E-05	6.472E-06	1.849E-06	2.936E-03	3.547E-08	7.339E-04
acenaphthene	1.682E-04	3.180E-04	ON	QN	QN	DN	QN
fluorene	2.490E-04	2.275E-04	2.658E-07	7.595E-08	1,206E-04	1.457E-09	3.015E-05
phenanthrene	3.516E-04	1.932E-04	1.961E-06	5.604E-07	8.897E-04	1.075E-08	2.224E-04
anthracene	5.198E-05	7.094E-06	5.558E-07	1.588E-07	2.521E-04	3.046E-09	6.303E-05
fluoranthene	1.712E-04	1.614E-05	1.920E-06	5.486E-07	8.709E-04	1.052E-08	2.177E-04
pyrene	3.254E-04	1.663E-05	3.823E-06	1.092E-06	1.734E-03	2,095E-08	4.335E-04
benzo(a)anthracene	2.751E-05	2.446E-06	3.406E-07	9.732E-08	1.545E-04	1.867E-09	3.863E-05
chrysene	2.751E-05	2.446E-06	3.406E-07	9.732E-08	1.545E-04	1.867E-09	3.863E-05
benzo(b)fluoranthene	7.178E-05	2.446E-06	8.889E-07	2.540E-07	4.032E-04	4.872E-09	1.008E-04
benzo(k)fluoranthene	4.740E-05	2.446E-06	5.870E-07	1.677E-07	2.662E-04	3,217E-09	6.656E-05
benzo(a)pyrene	1.089E-04	2.446E-06	1.349E-06	3.854E-07	6.119E-04	7.393E-09	1.530E-04
Indeno(1,2,3-cd)pyrene	1.530E-04	2.935E-06	1.858E-06	5.309E-07	8,428E-04	1.018E-08	2.107E-04
dlbenz(a,h)anthracene	5.148E-06	2.446E-06	6.375E-08	1.821E-08	2.892E-05	3,494E-10	7.229E-06
benzo(g,h,l)perylene	2.715E-04	5.626E-06	3.292E-06	9.406E-07	1.493E-03	1.804E-08	3.733E-04
Dioxin/Furan Data							
2378-TCDD	4.245E-10	8.000E-12	QN	QN	QN	QN	QN
12378-PECDD	3.225E-10	9.000E-12	QN	QN	QN	Q.	9
123478-HXCDD	5.490E-10	1.050E-11	QV	2	QN	QN	QN
123678-HXCDD	7.690E-10	1.700E-11	9.312E-12	2,661E-12	4.224E-09	5.104E-14	1.056E-09
123789-HXCDD	8.705E-10	1.550E-11	1.059E-11	3.025E-12	4.802E-09	5.803E-14	1.201E-09
1234678-HPCDD	9.178E-09	2,495E-10	1,106E-10	3.159E-11	5.015E-08	6.059E-13	1.254E-08
OCDD	4.458E-08	1.587E-09	5.324E-10	1.521E-10	2.415E-07	2.918E-12	6.037E-08
2378-TCDF	1.230E-10	1.100E-11	QN	2	ND	ON	QN
12378-PECDF	3.375E-10	1.050E-11	QN	QN	ND	QN	QN
23478-PECDF	1.950E-10	1.550E-11	DN	QN	QN	ON	QN
123478-HXCDF	1.840É-10	2.800E-11	QN	QN	QN	QN	QN
123678-HXCDF	1,795E-10	1.450E-11	QN	ON	QN	ON	QN
123789-HXCDF	3.220E-10	6.000E-12	QN	Q	QN	ON	QN

Table B-49: Air Modeling Output Data for Polynuclear Aromatic Hydrocarbons, Dioxins/Furans, Aldehydes, and Acid Gases 200 meter location

בסס ווופנפו וספמווסו							
	155mm p	ropelling charge	155mm propelling charge M3A1 (zone 3), M284 cannon DODIC: D540	84 cannon	No. of rounds (I) release duration (t):	← 4	1 rounds 4 seconds
	Ν	Net Explosive Welght (NEW) in Ibs.	(NEW) in lbs. =>	3.50	Unit Concentration (UC):	4.833E-05	4.833E-05 (a/m³)/(a/s)
		Number	Number of Items = 1				
		SF6 Leak Rate Dilution Factor	illution Factor =>	0.932			
		SALE TRANS			Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration	Measured Background	Average Adjusted Emission Factor	Average Adjusted Emission Factor	Emitted (grams/item)	Concentration for One Round (grams/m³)	Emission Rate for One Round (g/sec)
	(mg/m ₃)	(mg/m ₃)	(ID/Mem) EF	(Ib/Ib NEW)	W	CONC	ER,
234678-HXCDF	2.640E-10	1.200E-11	QN	ON .	QN	QN	QN
1234678-HPCDF	7.080E-10	7.750E-11	7.808E-12	2.231E-12	3.541E-09	4.279E-14	8.854E-10
1234789-HPCDF	3.755E-10	8.000E-12	QN	QN	QN	ND	QN
OCDF	1.436E-09	1.105E-10	1.641E-11	4.690E-12	7.445E-09	8.996E-14	1,861E-09
Aldehydes							
Formaldehyde	1.228E-02	1.228E-02	QN	QN	ON	QN	QN
Acetaldehyde	1.802E-02	1.802E-02	QN	QN	QN	ON	QN
Acetone	3.563E-02	4.751E-02	QN	QN	ON	QN	QN
Acrolein	2.294E-02	2.294E-02	QN	QN	ON	ON	QN
Proprionaldehyde	2.374E-02	2.374E-02	QN	QN	QN	ND	QN
Crotonaldehyde	2.867E-02	2.867E-02	QN	ND	ON	ON	QN
Butyraldehyde	2.949E-02	2.949E-02	QN	QN	QN	QN	QN
Benzaldehyde	4.340E-02	4,340E-02	QN	QN	QN	ON	QN
Isovaleraldehyde	3.523E-02	3.523E-02	QN	ND	ON	QN	QN
Valeraldefiyde	3.523E-02	3.523E-02	Q	Q.	QN	QN	ND
o,m,p-Tolualdehyde	9.828E-02	9.828E-02	2	9	ND	QN	QN
Hexaldehyde	4.097E-02	4.097E-02	2	QQ.	ND	ON	QN
2,5-Dimethylbenzaldehyde	4.097E-02	4.097E-02	ON .	QN	QN	QN	QN
Acid gases							
Hydrogen fluoride	1.400E-01	1.400E-01	QN	QN	QN	QN	QN
Hydrogen chloride	1.300E-01	1.300E-01	QN	ON	QN	S	QV
Hydrogen bromide	1.400E-01	1.400E-01	QN	ND	QN	Q	QN.
Nitric Acid	2.400E-01	2.200E-01	2.477E-04	7.076E-05	1.123E-01	1.357E-06	2.808E-02
Phosphoric acid	1.400E-01	1,400E-01	2	9	QN	ON	QN
Sulfuric Acid	2.950E-01	1.400E-01	3.653E-03	1.044E-03	1.657E+00	2.002E-05	4.142E-01
Footnotes:							

ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study)
ND = Not Detected

Table B-50: Air Modeling Output Data for Cyanide and Energetics - 200 meter location

	155mm p	ropelling charge DODI	155mm propelling charge M3A1 (zone 3), M284 cannon DODIC: D540	84 cannon	No. of rounds (I) release duration (t):	1	rounds
`	e V	Net Explosive Weight (NEW) in ibs Number of Items = 1 SF6 Leak Rate Dilution Factor	osive Weight (NEW) in ibs. => Number of Items = 1 Leak Rate Dilution Factor =>	3.50	Unit Concentration (UC):	4,833E-05	4.833E-05 (g/m³)/(g/s)
		Archemis	Arcelling patrice of the		Total Mass of Substance	Average Modeled	Substance
Compound	Measured Actual Concentration (mg/m³)	Measured Background Concentration (mg/m³)	Average Adjusted Emission Factor (Ib/item) EF	Average Adjusted Emission Factor (Ib/Ib NEW)	Emitted (grams/Item) M	Concentration for One Round (grams/m³) CONC	Emission Rate for One Round (g/sec) ER,
Particulate Cyanide and HCN							
Particulate Cyanide	8.000E-02	8.000E-02	QN	QN	QN	QN	Q
Hydrogen Cyanide	9.000E-01	8.500E-02	1.114E-02	3.184E-03	5.055E+00	6.108E-05	1.264E+00
Energetics Data							
Nitrobenzene	4.713E-01	2.031E-01	QN	QN	ND	QN	QN
2-Nitrotoluene	4.713E-01	2.031E-01	QN	QN	QN	QN	QN
3-Nitrotoluene	4.713E-01	2.031E-01	QN	QN	ON	QN	QV
4-Nitrotoluene	4.713E-01	2.031E-01	QN	QN	QN ·	QN	2
Nitroglycerine	4.713E-01	2.031E-01	QN	QN	QN	QN	2
1,3-Dinitrobenzene	4.713E-01	2.031E-01	QN	QN	QN	QN	QN
2,6-Dinitrotoluene	4.713E-01	2.031E-01	QN	QV	QN	QN	ND
2,4-Dinitrotoluene	4.713E-01	2.031E-01	QN	QN	QN	ND	ND
1,3,5-Trinitrobenzene	4.713E-01	2.031E-01	Q	S	QN	QN	ON
2,4,6-Trinitrotoluene	4.713E-01	2.031E-01	Q.	2	QN	QN	ON
RDX	4.713E-01	2.031E-01	QN	2	QN	QN	Q.
4-Amino-2,6-Dinitrotoluene	4.713E-01	2.031E-01	Q	Q	QN	QN	ND
2-Amino-4,6-Dinitrotoluene	4.713E-01	2.031E-01	QN	QN	ND	QN	QN
Tetryl	4.713E-01	2.031E-01	QN	QN	QN	QN	ON
НМХ	9.426E-01	4.062E-01	QN	ON.	QN	QN	QN
Pentaerythritoltetranitrate	9.426E-01	4.062E-01	QN	ON	QN	QN	ON
Dibutyl phthalate	2.357E+01	1.016E+01	QN	QN	QN	QN	QN
Dioctyl phthalate	2.357E+01	1.016E+01	Q.	Q	ND	QN	ND
Diphenylamine	1.178E+01	5.078E+00	QN	QN	ND	QN	QN

Footnotes:

¹ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emissions Study) ND = Not Detected

APPENDIX C

HEALTH-BASED SCREENING LEVELS AND ACUTE TOXICITY VALUES

Appendix C: Health-based Screening Levels and Acute Toxicity Values	ning Levels ar	d Acute To	cicity Value	8							
			For the (Chronic Eva	he Chronic Evaluation (HBSL	(Ts	1	For the	For the Acute Evaluation (ATV	luation (A	TV)
		Region 9	Toxicity	Region 3	Toxicity	Health-based Screening Level	ERPG	TEE	AFGL	Source	Acute Toxicity
Compound	CAS#	(mg/m³)	(c or nc)	(_E m/grl)	(c or nc)	('m/gu)	(mg/m ₃)	(,m/gr)	(mg/m ₃)	(T or E)	(hg/m²)
Permanent Gases											
NH ₃	7664-41-7	1.04E+02	2	1.04E+02	nc	1.04E+02	1.75E+04	1.75E+04	AA	ш	1.75E+04
Carbon Dioxide (CO ₂)	124-38-9	NA		NA		AN	ΝA	5.40E+07	Α×	T	5.40E+07
Carbon Monoxide (CO)	630-08-0	1.57E+02		NA		1.57E+02	2.30E+05	2.28E+05	N A	ш	2.30E+05
Nitrogen Oxides (as NO)	10024-97-2	1.00E+02		ΑN		1.00E+02	NA	2.70E+05	AN	⊢	2.70E+05
Methane (CH ₄)	74-82-8	AN		۸A		NA	ΑN	3.30E+06	AA	F	3.30E+06
Sulfur Dioxide (SO ₂)	7446-09-5	8.00E+01		ΑA		8.00E+01	7.89E+02	7.86E+02	AA	ш	7.89E+02
Particulate Matter											
TSP	12789-66-1	5.00E+01		ΝA		5.00E+01	AN	AN	NA		NA
PM ₁₀		5.00E+01		AN		5.00E+01	NA	AN	NA		¥ V
PM _{2.5}		1.50E+01		ΑN		1.50E+01	AN	¥	AA		NA A
Metals											
Antimony	7440-36-0	NA		1.46E+00	nc	1.46E+00	NA	1.50E+03	NA	L	1.50E+03
Arsenic	7440-38-2	4.47E-04	0	4.15E-04	၁	4.47E-04	NA	3.00E+01	NA	_	3.00E+01
Barlum	7440-39-3	5.21E-01	nc	5.11E-01	nc	5.21E-01	NA	1.50E+03	NA	_	1.50E+03
Beryllium	7440-41-7	8.00E-04	၁	7.45E-04	၁	8.00E-04	NA	5.00E+00	۷A	⊢	5.00E+00
Cadmium	7440-43-9	1.07E-03	၁	9.94E-04	၁	1.07E-03	NA	3.00E+01	NA	⊢	3.00E+01
Chromium	7440-47-3		၁	1.53E-04	၁	1.53E-04	NA	1.50E+03	NA	⊢	1.50E+03
Cobalt	7440-48-4	AN		2.20E+02	nc	2.20E+02	NA	6.00E+01	NA	⊢	6.00E+01
Copper	7440-50-8	ΑN		1.46E+02	nc	1.46E+02	NA	3.00E+03	٧A	L	3.00E+03
Lead	7439-92-1	1.50E+00		NA		1.50E+00	NA	1.50E+02	NA	⊢	1.50E+02
Manganese	7439-96-5	5.11E-02	nc	5.22E-02	nc	5.11E-02	NA	3.00E+03	NA	1	3.00E+03
Nickel	7440-02-0	NA		7.30E+01	nc	7.30E+01	NA	3.00E+03	NA	⊢	3.00E+03
Selenium	7782-49-2	NA		1.83E+01	nc	1.83E+01	NA	6.00E+02	NA	⊢	6.00E+02
Silver	7740-22-4			1.83E+01	n	1.83E+01	ΝΑ	3.00E+02	NA	Τ	3.00E+02
Thallium	7440-28-0			2.56E-01	nc	2.56E-01	NA NA	3.00E+02		T	3.00E+02
Zinc	7440-66-6	Ϋ́		1.10E+03	nc	1.10E+03	ΑN	3.00E+04	¥	-	3.00E+04
NOCS		1000		200		1000					
Dichiorodifluoromethane	75-71-8	Z.09E+0Z	2	1.83E+02	nc	Z.09E+0Z	NA	1.48E+07	Ā	-	1.48E+07
Methyl Chloride	74-87-3	1.07E+00	ပ	1.79E+00	ပ	1.07E+00	ΑN	2.06E+05	AN A	F	2.06E+05
Dichlorotetrafluoroethane	1320-37-2	Y V		AA		¥.	ΥA	ΝA	A		NA
Vinyl Chloride	75-01-4	2.20E-02	ပ	2.10E-02	ပ	2.20E-02	ΝA	1.28E+04	ΑN	Τ	1.28E+04
1,3-Butadiene	106-99-0	3.74E-03	၁	3.48E-03	ပ	3.74E-03	2.20E+04	2.21E+04	AN	m	2.20E+04
Methyl Bromide	74-83-9	5.21E+00	nc	5.11E+00	nc	5.21E+00	NA	5.82E+04	AN	1	5.82E+04
Ethyl Chloride	75-00-3	2.32E+00	nc	NA		2.32E+00	NA	7.92E+06		7	7.92E+06
Trichlorofluoromethane	75-69-4	7.30E+02	nc	7.30E+02	nc	7.30E+02	NA	2.81E+06	AN	T	2.81E+06
1,1-Dichloroethene	75-35-4	3.84E-02	ပ	3.58E-02	၁	3.84E-02	Ϋ́	7.92E+04	5.3	Α	7.92E+04
Dichloromethane	75-09-2	4.09E+00	O	3.79E+00	ပ	4.09E+00	6.96E+05	6.94E+05	¥	ш	6.96E+05

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Appendix C: Health-based Screening Levels and Acute Toxicity V	ing Levels a	nd Acute Tox	ricity Values	8							
			For the	Chronic Ev	the Chronic Evaluation (HBSL	SL)		For the	Acute Eva	For the Acute Evaluation (ATV)	IV)
		Region 9 PRG	Toxicity	Region 3 RBC	Toxicity Endpoint	Health-based Screening Level	ERPG	TEEL	AEGL	Source	Acute Toxicity
Compound	CAS#	(mg/m²)	(c or nc)	('m/gu)	(c or nc)	(µg/m²)	(µg/m³)	(mg/m³)	(m/grl)	(T or E)	(,m/gr)
3-Chloropropene	`	1.04E+00	nc	NA		1.04E+00	9.39E+03	9.39E+03	AN	ш	9.39E+03
1,1,2-Trichloro-1,2,2-trifluoroethane	4	3.13E+04	nc	3.14E+04	nc	3.13E+04	NA	9.58E+06	AN	-	9.58E+06
1,1-Dichloroethane	75-34-3	5.21E+02	nc	5.11E+02	nc	5.21E+02	NA	1.21E+06	AN	-	1.21E+06
cis-1,2-Dichloroethene	156-59-2	3.65E+01	nc	3.65E+01	nc	3.65E+01	NA	7.92E+05	AA	-	7.92E+05
Trichloromethane	67-66-3	8.35E-02	၁	7.70E-02	၁	8.35E-02	NA	9.76E+03	AN	-	9.76E+03
1,2-Dichloroethane	107-06-2	7.39E-02	၁	6.88E-02	၁	7.39E-02	NA	8.08E+03	AN	_	8.08E+03
1,1,1-Trichloroethane	71-55-6	1.04E+03	nc	2.30E+03	nc	1.04E+03	1.94E+06	1.91E+06	AA	Ш	1.94E+06
Вепzепе	71-43-2	2.49E-01	၁	2.16E-01	ဝ	2.49E-01	1.56E+05		ΑĀ	ш	1.56E+05
Carbon Tetrachloride	56-23-5	1.28E-01	၁	1.18E-01	C	1.28E-01	1.28E+05		ΑN	ш	1.28E+05
1,2-Dichloropropane	78-87-5	9.89E-02	၁	9.21E-02	၁	9.89E-02	NA	5.08E+05	۸A	-	5.08E+05
Trichloroethene	79-01-6		ဝ	1.04E+00	၁	1.12E+00	5.38E+05	5.37E+05	NA	ш	5.38E+05
cis-1,3-Dichloropropene	10061-01-5		၁	4.82E-02	၁	5.17E-02	NA	1.14E+04	ΑN	-	1.14E+04
trans-1,3-Dichloropropene	10061-02-6	5.17E-02	၁	4.82E-02	၁	5.17E-02	NA	AN	NA		NA
1,1,2-Trichloroethane	79-00-5	1.20E-01	ပ	1.12E-01	၁	1.20E-01	NA	1.64E+05	NA	-	1.64E+05
Toluene	108-88-3	4.02E+02	nc	4.16E+02	nc	4.02E+02	1.88E+05	1.89E+05	NA	ш	1.88E+05
1,2-Dibromoethane	106-93-4	8.73E-03	၁	8.24E-03	၁	8.73E-03	NA	1.54E+05	AN	-	1.54E+05
Tetrachloroethene	127-18-4	3.31E+00	ပ	3.13E+00	ပ	3.31E+00	AN	6.78E+05	NA	T	6.78E+05
Chlorobenzene	108-90-7	6.21E+01	nc	6.21E+01	ПС	6.21E+01	AN	1.38E+05	NA	L	1.38E+05
Ethylbenzene	100-41-4	1.06E+03	nc	1.06E+03	nc	1.06E+03	NA	5.43E+05	NA	⊢	5.43E+05
m&p-Xylene	108-38-3 106-42-3	7.30E+02	nc	7.30E+03	nc	7.30E+02	NA A	6.51E+05	A A	F	6.51E+05
Styrene	100-42-5	1.06E+03	nc	1.04E+03	nc	1.06E+03	2.13E+05	2.13E+05	¥	ш	2.13E+05
1,1,2,2-Tetrachloroethane	79-34-5	3.31E-02	၁	3.13E-02	၁	3.31E-02		2.06E+04	¥	-	2.06E+04
o-Xylene	95-47-6	7.30E+02	nc	7.30E+03	nc	7.30E+02	NA	6.51E+05	¥	-	6.51E+05
4-Ethyltoluene	622-96-8	Ϋ́		NA		NA		1.25E+05	NA	_	1.25E+05
1,3,5-Trimethylbenzene	108-67-8	6.21E+00	nc	6.21E+00	nc	6.21E+00	AA	3.68E+05	NA	⊥	3.68E+05
1,2,4-Trimethylbenzene	95-63-6	6.21E+00	nc	6.21E+00	nc	6.21E+00	NA	1.80E+05	¥	-	1.80E+05
Benzyl Chloride	100-44-7	3.96E-02	O	3.68E-02	υ	3.96E-02	5.20E+03	5.17E+03	¥	Ш	5.20E+03
m-Dichlorobenzene	541-73-1	3.29E+00	uc	3.29E+00	2	3.29E+00	ΑN	3.61E+04	¥	-	3.61E+04
p-Dichlorobenzene	106-46-7	3.06E-01	ပ	2.85E-01	ပ	3.06E-01	AA	6.61E+05	NA NA	_	6.61E+05
o-Dichlorobenzene	95-50-1	2.09E+02	nc	3.29E+01	20	2.09E+02	A A	3.01E+05	A	⊢	3.01E+05
1,2,4-Trichlorobenzene	120-82-1	2.08E+02	nc	2.08E+02	2	2.08E+02	AN	3.71E+04	NA	⊢	3.71E+04
Hexachlorobutadiene	87-68-3	8.62E-02	ပ	8.03E-02	ပ	8.62E-02	3.21E+04	3.20E+04	NA	Ε	3.21E+04
Hydrocarbons											
Methane	74-82-8	ΝΑ		Ϋ́		NA	NA	3.30E+06	NA	1	3.30E+06
Ethane	74-84-0	Ϋ́		Ϋ́		NA		AN	NA		NA
Ethylene	74-85-1	Y.		¥.		NA	ΑN	4.60E+05	¥	-	4.60E+05
Propane	74-98-6	AN		¥.		NA		3.78E+06	¥	-	3.78E+06
Acetylene	74-86-2	AN N		NA		NA	¥.	AN N	A A		NA

Appendix C: Health-based Screening Levels and Acute Toxicity Values	ning Levels a	nd Acute Tox	cicity Value	8							
			For the	Chronic Ev	he Chronic Evaluation (HBSL)	(18)		For the	For the Acute Evaluation (ATV)	luation (A	2
		Region 9	Toxicity	Region 3	Toxicity	Health-based					Acute Toxicity
Composing	# 645	PRG	Endpoint (c. or nc.)	RBC (iig/m³)	Endpoint	Screening Level	(III/m ³)	TEEL (m/m³)	AEGL (IIO/m ³)	Source	Value
Isohitane	75-28-5	AN	(21)	NA	(a a. a.)	NA	NA	0 52F±05	NA	1 5 -	0 525+05
n-Butane	106-97-8	ΥA		N N		NA V	¥	5.71E+06	×	- -	5.71E+06
Propylene	115-07-1	ΑN		A		AN	¥	Ą	NA A		NA
SVOCs											
n-nitrosodimethylamine	65-72-8	1.37E-04	O	1.23E-04	၁	1.37E-04	NA	2.50E+03	ΑN	⊢	2.50E+03
bis(2-chloroethyl)ether	111-44-4	5.82E-03	0	5.69E-03	၁	5.82E-03	A	5.85E+04	ΑN	-	5.85E+04
phenol	108-95-2	2.19E+03	uc	2.19E+03	JC UC	2.19E+03	Ä	3.85E+04	ΑN	⊢	3.85E+04
2-chlorophenol	92-24-8	1.83E+01	nc	1.83E+01	2	1.83E+01	₹	5.25E+03	AN	⊢	5.25E+03
1,3-dichlorobenzene	541-73-1	3.29E+00	nc	3.29E+00	nc	3.29E+00	ΑN	3.61E+04	ΑN	L	3.61E+04
1,4-dichlorobenzene	106-46-7	3.06E-01	၁	2.85E-01	ပ	3.06E-01	NA	6.61E+05	NA	j-	6.61E+05
1,2-dichlorobenzene	95-50-1	2.09E+02	nc	3.29E+01	nc	2.09E+02	ΝA	3.01E+05	NA	۰	3.01E+05
benzyl alcohol	100-51-6	1.10E+03	nc	1.10E+03	nc	1.10E+03	Ν	5.53E+04	NA	⊥	5.53E+04
bis(2-chloroisopropyl)ether	108-60-1	1.92E-01	၁	1.79E-01	၁	1.92E-01	NA	6.99E+04	NA	1	6.99E+04
2-methylphenol	95-48-7	1.83E+02	uc	1.83E+02	nc	1.83E+02	Ν	NA	AN		NA
hexachloroethane	67-72-1	4.80E-01	၁	4.47E-01	၁	4.80E-01	ΑN	2.90E+04	¥	-	2.90E+04
n-nitroso-di-n-propylamine	621-64-7	9.61E-04	၁	8.94E-04	၁	9.61E-04	ΝA	2.00E+02	¥	F	2.00E+02
4-methylphenol	106-44-5	1.83E+02	nc	1.83E+02	nc	1.83E+02	NA	NA	NA		NA NA
nitrobenzene	98-95-3	2.09E+00	nc	2.19E+00	nc	2.09E+00	NA	1.51E+04	AA	۰	1.51E+04
isophorone	78-59-1	7.08E+00	၁	6.59E+00	ပ	7.08E+00	NA	2.83E+04	NA	T	2.83E+04
2-nitrophenol	88-75-5	AN		Ϋ́		AA	ΑN	NA	NA		NA
2,4-dimethylphenol	105-67-9	7.30E+01	nc	7.30E+01	nc	7.30E+01	NA	NA	NA		NA
bis(2-chloroethoxy)methane	111-91-1	Y V		NA		NA	ΑN	ΝΑ	NA		NA
2,4-dichlorophenol	120-83-2	1.10E+01	nc	1.10E+01	nc	1.10E+01	NA	3.00E+04	NA	L	3.00E+04
1,2,4-trichlorobenzene	120-82-1	2.08E+02	nc	2.08E+02	nc	2.08E+02	AA	3.71E+04	NA	⊢	3.71E+04
naphthalene	91-20-3	3.13E+00	nc	3.29E+00	nc	3.13E+00	NA	7.86E+04	NA	1	7.86E+04
4-chloroaniline	106-47-8	1.46E+01	nc	1.46E+01	nc	1.46E+01	¥.	_	NA	_	3.00E+04
hexachlorobutadiene	87-68-3	8.62E-02	S	8.03E-02	ပ	8.62E-02	3.21E+04	-	NA	Ш	3.21E+04
4-chloro-3-methylphenol	59-50-7	ΑN		ΑN		AA	NA	2.00E+04	NA	1	2.00E+04
2-methylnaphthalene	91-57-6	NA NA		7.30E+01	nc	7.30E+01	¥	2.00E+04	NA	T	2.00E+04
hexachlorocyclopentadiene	77-47-4	7.30E-02	nc	7.30E-02	nc	7.30E-02	ΑN	2.23E+02	NA	T	2.23E+02
2,4,6-trichlorophenol	88-06-2	1.10E+02	nc	1.10E+02	nc	1.10E+02	ΥN	3.00E+04	NA	⊥	3.00E+04
2,4,5-trichlorophenol	95-95-4	3.65E+02	nc	3.65E+02	nc	3.65E+02	ΑN	3.00E+04	¥	⊢	3.00E+04
2-chloronaphthalene	91-58-7	2.92E+02	nc	2.92E+02	nc	2.92E+02	A V	6.00E+02	ΑN	T	6.00E+02
2-nitroaniline	88-74-4	2.09E-01	nc	2.08E-01	nc	2.09E-01	AN A	AN.	NA		NA
dimethylphthalate	131-11-3	3.65E+04	nc	3.65E+04	nc	3.65E+04	¥	1.50E+04	NA	T	1.50E+04
2,6-dinitrotoluene	606-20-2	3.65E+00	nc	3.65E+00	nc	3.65E+00	NA	6.00E+02	NA	1	6.00E+02
3-nitroaniline	99-09-2	AN		NA		AN	NA	ΝΑ	NA		NA
2,4-dinitrophenol	51-28-5	7.30E+00	nc C	7.30E+00		7.30E+00	ΑN	7.50E+03	NA		7.50E+03
dibenzofuran	132-64-9	1.46E+01	ည	1.46E+01	nc	1.46E+01	A A	Ϋ́	¥		NA

Appendix C: Health-based Screening Levels and Acute Toxicity Va	ing Levels a	nd Acute Too	cicity Values For the C	S Chronic Fu	lues he Chronic Evaluation (HRSI				Active	Ext the Assiste Exellent (ATV	10.5
		0							שנחום בגי	W) Hollani	A .
		& Holgen	Fadnoint	Keglon 3	Toxicity	Health-based			Č		Acute Toxicity
Compound	CAS#	('m/grl)	(c or nc)	(, m/grl)	(c or nc)	(,m/Brl)	(mg/m³)	(ng/w _,)	(ma/m²)	Source (T or E)	(ud/m²)
2,4-dinitrotoluene	121-14-2	7.30E+00	nc	7.30E+00	nc	7.30E+00	Ϋ́	6.00E+02	AN	-	6 00F+02
4-nitrophenol	100-02-7	2.92E+01	nc	2.92E+01	nc	2.92E+01	AN	3.00E+04	¥.	-	3.00E+04
4-chlorophenyl-phenylether	7005-72-3	NA		NA		NA	AN	AN	AN		NA V
diethylphthalate	84-66-2	2.92E+03	nc	2.92E+03	nc	2.92E+03	NA	1.50E+04	AN	-	1.50E+04
4-nitroaniline	100-01-6	ΑN		۸N		NA	NA	9.00E+03	AN	F	9.00E+03
4,6-dinitro-2-methylphenol	534-52-1	A V		3.65E-01	nc	3.65E-01	ΑA	5.00E+02	AN	F	5.00E+02
n-nitrosodiphenylamine(1)	86-30-6	1.37E+00	၁	1.28E+00	c	1.37E+00	Ν	ΑN	NA NA		AN
4-bromophenyl-phenylether	101-55-3	ΑΝ		NA		NA	ΑN	ΑN	NA NA		NA
hexachlorobenzene	118-74-1	4.18E-03	ပ	3.91E-03	ပ	4.18E-03	Ν	7.50E+01	A A	F	7.50E+01
pentachlorophenol	87-86-5	5.60E-02	၁	5.22E-02	၁	5.60E-02	Ϋ́	1.50E+03	¥	-	1.50E+03
di-n-butylphthalate	84-74-2	3.65E+02	nc	3.65E+02	nc	3.65E+02	ΑA	1.50E+04	¥	F	1.50E+04
butylbenzylphthalate	85-68-7	7.30E+02	nc	7.30E+02	nc	7.30E+02	NA	5.00E+05	¥	-	5.00E+05
bis(2-ethylhexyl)phthalate	117-81-7	4.80E-01	င	4.47E-01	၁	4.80E-01	ΑĀ	1.00E+04	¥	-	1.00E+04
di-n-octylphthalate	117-84-0	7.30E+01	nc	7.30E+01	nc	7.30E+01	¥	1.50E+05	NA	-	1.50E+05
PAHS											
acenaphthylene	208-96-8	NA		Ϋ́		AA	¥	2.00E+02	Ą	-	2.00F+02
acenaphthene	83-32-9	2.19E+02	nc	2.19E+02	nc	2.19E+02	Ą	1.25E+03	AN M	, —	1.25E+03
fluorene	86-73-7	1.46E+02	nc	1.46E+02	nc	1.46E+02	¥	7.50E+04	AA	-	7.50E+04
phenanthrene	85-01-8	NA		NA		ĄN	AA	2.00E+03	¥	-	2.00E+03
anthracene	120-12-7	1.10E+03	nc	1.10E+03	nc	1.10E+03	AN	6.00E+03	AN	-	6.00E+03
fluoranthene	206-44-0	1.46E+02	nc	1.46E+02	nc	1.46E+02	A	3.00E+01	AA	L	3.00E+01
pyrene	129-00-0	1.10E+02	nc	1.10E+02	nc	1.10E+02	AA	1.50E+04	AA	F	1.50E+04
benzo(a)anthracene	56-55-3	2.17E-02	ပ	8.58E-03	o	2.17E-02	AN	6.00E+02	NA	F	6.00E+02
chrysene	218-01-9	2.17E+00	ပ	8.58E-01	၁	2.17E+00	AN	2.00E+02	NA	-	2.00E+02
benzo(b)fluoranthene	205-99-2	2.17E-02	ပ	8.58E-03	၁	2.17E-02	AN	ΑN	AA		¥
benzo(k)fluoranthene	207-08-9	2.17E-01	ပ	8.58E-02	၁	2.17E-01	NA	NA	NA		AA
benzo(a)pyrene	50-32-8	2.17E-03	ပ	2.02E-03	ပ	2.17E-03	ΑN	7.50E+03	NA	Ţ	7.50E+03
Indeno(1,2,3-cd)pyrene	193-39-5	2.17E-02	O	8.58E-03	ပ	2.17E-02	Ϋ́	AN	NA		NA
dibenz(a,n)antinacene	53-70-3	2.1/E-03	ပ	8.58E-04	ပ	2.17E-03	¥	3.00E+04	ΑN	L	3.00E+04
penzo(g,n,l)perylene	191-24-2	AA A		¥		NA	A	3.00E+04	¥		3.00E+04
October 1	0 10 0121	00 107 7									
23/8-1 etrachiorogipenzo-p-dioxin	1/46-01-6	4.48E-08	٥	4.17E-08	υ	4.48E-08	NA	3.50E+00	NA	T	3.50E+00
12378-Pentachlorodibenzo-p-dloxin	40321-76-4	ΑN		ΑΝ		NA	NA	2.50E+00	NA	⊢	2.50E+00
123478-Hexachlorodibenzo-p-dioxin	39227-28-6	AA		A A		NA	NA	NA	NA		Ą
123678-Hexachlorodibenzo-p-dioxin	57653-85-7	A A		Ϋ́		NA	AN	1.50E+01	ΑN	⊢	1.50E+01
123789-Hexachlorodibenzo-p-dioxin	19408-74-3	1.48E-06	၀	1.38E-06	၁	1.48E-06	Ϋ́	AN	ΑN		Ą
1234678-Heptachlorodibenzo-p-dioxin	35822-46-9	ΑN		AN		NA	ΑN	ΑN	ΑN		Ą
Octachlorodibenzo-p-dioxin	3268-87-9	ΑN		NA		NA	ΑN	ΑN	NA A		¥.
2378-Tetrachlorodibenzo-p-furan	51207-31-9	NA		NA		ΝΑ	Ϋ́	2.00E+00	ΑN	-	2.00E+00

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Appendix of the same server and Levers and Acute 10xicity values	IIII Levels a	nd Acute 10x	cicity value	8	liues en la constant de la constant						
		0		SHOILE EV	manon (no	(10		ror the	For the Acute Evaluation (ATV	lluation (A	IV)
		& uoibex	Endnoint	Region 3	Toxicity	Health-based	1	i			Acute Toxicity
Compound	CAS#	(,m/grl)	(c or nc)	(hg/m²)	(c or nc)	(hg/m ₃)	(µg/m²)	(ug/m³)	(ua/m³)	Source	Value (IIII/m³)
2,4-dinitrotoluene	121-14-2	7.30E+00	20	7.30E+00	uc	7.30E+00	¥	6.00E+02	NA	<u> </u>	6 00E+02
4-nitrophenol	100-02-7	2.92E+01	nc	2.92E+01	nc	2.92E+01	¥	3.00E+04	NA	-	3.00F+04
4-chlorophenyl-phenylether	7005-72-3	NA		NA		NA	ΑN	ΑN	MA		NA
diethylphthalate	84-66-2	2.92E+03	nc	2.92E+03	nc	2.92E+03	¥.	1.50E+04	MA	<u> -</u>	1.50F+04
4-nitroaniline	100-01-6	A A		NA		NA	AN	9.00E+03	NA	-	9.00E+03
4,6-dinitro-2-methylphenol	534-52-1	AA		3.65E-01	2	3.65E-01	AN	5.00E+02	AA	-	5.00F+02
n-nitrosodiphenylamine(1)	86-30-6	1.37E+00	၁	1.28E+00	ပ	1.37E+00	NA	AN	¥		NA
4-bromophenyi-phenylether	101-55-3	AN AN		NA		NA	¥.	ΑN	¥		NA
hexachlorobenzene	118-74-1	4.18E-03	ပ	3.91E-03	၁	4.18E-03	A A	7.50E+01	¥	-	7.50F+01
pentachlorophenol	87-86-5	5.60E-02	ပ	5.22E-02	၁	5.60E-02	AN	1.50E+03	AA	-	1.50E+03
di-n-butyiphthalate	84-74-2	3.65E+02	nc	3.65E+02	nc	3.65E+02	ΑN	1.50E+04	AN	 -	1.50E+04
butylbenzylphthalate	85-68-7	7.30E+02	nc	7.30E+02	nc	7.30E+02	NA	5.00E+05	AN	-	5.00E+05
bis(2-ethylhexyl)phthalate	117-81-7	4.80E-01	ပ	4.47E-01	ဝ	4.80E-01	ΑA	1.00E+04	AA	-	1.00E+04
di-n-octylphthalate	117-84-0	7.30E+01	nc	7.30E+01	nc	7.30E+01	¥	1.50E+05	ΑN	-	1.50F+05
PAHS											
acenaphthylene	208-96-8	NA		NA		ΑN	¥	2.00E+02	Ą	-	2.00F+02
acenaphthene	83-32-9	2.19E+02	nc	2.19E+02	nc	2.19E+02	¥	1.25E+03	ΑN	-	1 25F+03
fluorene	86-73-7	1.46E+02	nc	1.46E+02	nc	1.46E+02	¥	7.50E+04	¥	F	7.50F+04
phenanthrene	85-01-8	NA		NA		NA	¥	2.00E+03	¥	L	2.00E+03
anthracene	120-12-7	1.10E+03	nc	1.10E+03	nc	1.10E+03	ΑN	6.00E+03	¥.	-	6.00E+03
· fluoranthene	206-44-0	1.46E+02	nc	1.46E+02	nc	1.46E+02	A	3.00E+01	¥	F	3.00E+01
pyrene	129-00-0	1.10E+02	20	1.10E+02	nc	1.10E+02	NA	1.50E+04	A	-	1.50E+04
benzo(a)anthracene	56-55-3	2.17E-02	S	8.58E-03	ပ	2.17E-02	NA	6.00E+02	AN	⊢	6.00E+02
chrysene	218-01-9	2.17E+00	ပ	8.58E-01	ပ	2.17E+00	NA	2.00E+02	A	F	2.00E+02
penzo(b)fluoranthene	202-99-2	2.17E-02	ပ	8.58E-03	ပ	2.17E-02	NA	NA	¥		NA
penzo(k)iluorantnene	207-08-9	2.17E-01	ပ	8.58E-02	υ	2.17E-01	NA	AN	NA		NA
penzo(a)pyrene	50-32-8	2.1/E-03	O	2.02E-03	O	2.17E-03	ΑA	7.50E+03	NA	⊢	7.50E+03
dihenzia historia	193-39-3	2.17E-02	O (8.58E-03	O	2.17E-02	Y Y	ΑN	ΑN		NA
henzo(a h ihendene	101-70-5	Z. 17E-U3	0	0.30E-U4	0	Z.1/E-03	¥.	3.00E+04	¥	-	3.00E+04
Dioxins / Firans	7-17-161	5		<u> </u>		NA	NA	3.00E+04	¥	-	3.00E+04
2378-Tetrachlorodibenzo-p-dioxin	1746-01-6	4 4RF-08	,	4 175.08	,	A 40E 00	AIA	00.707.0		,	
12378-Pentachlorodibenzo-p-dloxin	40321-76-4	NA		NA AN	,	ALTON-UG		3.300.400	¥2	-	3.50E+00
123478-Hexachlorodibenzo-p-dioxin	39227-28-6			ΔN		SIN VIN	2	2.305+00	Y.	-	Z.50E+00
123678-Hexachlorodihenzo-n-dioxin	57653 BE 7			<u> </u>		X	Y.	AN.	AA.		NA
123789-Hexachlorodibenzo-r-diovin	10408 74 2	+		NA SOF		AN .	¥.	1.50E+01	YA N	-	1.50E+01
1934678 Honfachlandihana a diada	19400-14-5	1.40E-00	o l	1.38E-Ub	٥	1.48E-06	¥	NA	Ϋ́		NA
Octachlorodiharzo-n-dioxin	3269 87 0	Y S		¥ S		NA.	¥.	¥ X	ΑA		NA
2378-Tetrachlorodibenzo-p-furan	54207 34 0	4 5		¥ S		AN :	¥.	ΑĀ	¥		NA
	0.10210	T V		¥		NA.	NA	2.00E+00	NA	-	2.00E+00

C-5

Appendix C: Health-based Screening Levels and Acute Toxicity	ng Levels a	nd Acute Tox	ricity Values								
			For the	Chronic Ev	r the Chronic Evaluation (HBSL	SL)		For the	Acute Eva	For the Acute Evaluation (ATV	2
		Region 9	Toxicity	Region 3	Toxicity	Health-based					Acute Toxicity
		PRG	Endpoint	RBC	Endpoint	Screening Level	ERPG	TEEL	AEGL	Source	Value
Compound	CAS#	(lug/m²)	(c or nc)	(ˈng/m²)	(cornc)	(þg/m²)	(, m/Brl)	('m/grl)	(hg/m³)	(T or E)	(m/g/m ₃)
Nitroglycerine	55-63-0	4.80E-01	၁	4.47E-01	၁	4.80E-01	AN	¥	ΑN		NA AN
1,3-Dinitrobenzene	99-62-0	3.65E-01	nc	3.65E-01	nc	3.65E-01	AN	3.00E+03	¥	L	3.00E+03
2,6-Dinitrotoluene	606-20-2	3.65E+00	nc	3.65E+00	nc	3.65E+00	ΑN	6.00E+02	¥	۲	6.00E+02
2,4-Dinitrotoluene	121-14-2	7.30E+00	nc	7.30E+00	nc	7.30E+00	Ν	6.00E+02	AA	-	6.00E+02
1,3,5-Trinitrobenzene	99-35-4	1.10E+02	nc	1.10E+02	nc	1.10E+02	AN	3.00E+04	¥	_	3.00E+04
2,4,6-Trinitrotoluene	118-96-7	2.24E-01	ပ	2.09E-01	၁	2.24E-01	NA	2.50E+04	ΑN	-	2.50E+04
RDX	121-82-4	6.11E-02	ပ	5.69E-02	C	6.11E-02	NA	Ϋ́	NA		AN A
4-Amino-2,6-Dinitrotoluene	19406-51-0			ΑN		NA	NA	Ϋ́	ΑN		AN
2-Amino-4,6-Dinitrotoluene	35572-78-2	_		NA		NA	ΑN	1.50E+04	A	۲	1,50E+04
Tetryl	479-45-8	3.65E+01	nc	3.65E+01	nc	3.65E+01	NA	Ϋ́	AN		AN
HMX	2691-41-0	1.83E+02	nc	1.83E+02	nc	1.83E+02	NA	ΝΑ	AN		AN
Pentaerythritoltetranitrate	78-11-5	NA		NA		NA	NA	5.00E+01	AN	-	5.00E+01
Dibutyi phthalate	84-74-2	3.65E+02	nc	3.65E+02	nc	3.65E+02	Ϋ́	1.50E+04	AA	-	1.50E+04
Dioctyl phthalate	117-81-7	4.80E-01	ပ	4.47E-01	၁	4.80E-01	NA	1.00E+04	AA	F	1.00E+04
Diphenylamine	122-39-4	9.13E+01	nc	9.13E+01	nc	9.13E+01	AA	3.00E+04	AN	F	3.00E+04
Footnotes:											
PRG = Preliminary Remediation Goals	S										
c = cancer											
nc = noncancer											
RBC = Risk-Based Concentrations											
HBSL = Health-Based Screening Level	le										
(E) ERPG = Emergency Response Planning Guildeines	anning Guilc	leines									
(T) TEEL = Temporary Emergency Exposure Limits	sposure Limi	S									
ATV = Acute Toxicity Value											
NA = Not applicable											

APPENDIX D RISK ASSESSMENT DATA

RISK EVALUATION DATA FOR CHARGE M3, FIRED FROM THE M199 CANNON, ZONE 3, 100 METERS DOWNWIND

Table D-1: Comparison of Air Concentrations With Health-Based Values: Gases, Particulates and Metals

		165#	n.propelling	okarge Dobic	155mm propelling charge M3 (zone 3), M199 cannon DODIC: DS4p	AT39 cannon		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 12	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacuto/ ATV	> 12
Gases								
NH ₃	2.10E+00	1.04E+02	2.01E-02	no	2.34E+03	1.75E+04	1.34E-01	2
Carbon Dioxide (CO ₂)	3.28E+01	N/		na	1.47E+05	5.40E+07	2.71E-03	2
Carbon Monoxide (CO)	9.20E+01	1.57E+02	5.86E-01	no	1.03E+05	2.30E+05	4.46E-01	2
Nitrogen Oxides (as NO)	6.51E-01	1.00E+02	6.51E-03	no	2.91E+03	2.70E+05	1.08E-02	2
Methane (CH₄)	NA A	N N		na	۷V	3.30E+06		na
Sulfur Dioxide (SO ₂)	NA	8.00E+01		na	Ą	7.89E+02		na
Combined Particulate								
TSP	4.25E+00	5.00E+01	8.50E-02	20	4.74E+03	AN		60
PM ₁₀	3.22E+00	5.00E+01	6.43E-02	ou	3.59E+03	Ā		eu Ba
PM _{2.5}	1.26E+00	1.50E+01	8.40E-02	20	1.41E+03	A Z		e C
Metais								
Antimony	1.14E-10	1.46E+00	7.79E-11	2	5.08E-01	1.50E+03	3.39F-04	000
Arsenic	9.89E-05	4.47E-04	2.21E-01	u	1.03E+00	3.00E+01	3.44E-02	2
Barium	5.94E-03	5.21E-01	1.14E-02	no	2.65E+01	1.50E+03	1.77E-02	02
Beryllium	NA	8.00E-04		na	AN	5.00E+00		na E
Cadmium	4.31E-05	1.07E-03	4.04E-02	no	4.50E-01	3.00E+01	1.50E-02	01
Chromium	3.74E-04	1.53E-04	2.45E+00	yes	3.89E+00	1.50E+03	2.60E-03	ou
Cobalt	7.57E-05	2.20E+02	3.44E-07	10	3.38E-01	6.00E+01	5.64E-03	OL
Copper	6.98E-01	1.46E+02	4.78E-03	no	3.12E+03	3.00E+03	1.04E+00	yes
Lead	1.37E-02	1.50E+00	9.10E-03	no	6.10E+01	1.50E+02	4.07E-01	2
Manganese	2.51E-03	5.11E-02	4.92E-02	no	1.12E+01	3.00E+03	3.74E-03	ou
Nickel	1.57E-09	7.30E+01	2.15E-11	no	6.99E+00	3.00E+03	2.33E-03	92
Selenium	ΑΝ	1.83E+01		na	NA	6.00E+02		na
Silver	4.38E-11	1.83E+01	2.40E-12	по	1.96E-01	3.00E+02	6.52E-04	20
Thailium	AN.	2.56E-01		na	NA	3.00E+02		na
Zinc	9.99E-08	1.10E+03	9.12E-11	no	4.46E+02	3.00E+04	1.49E-02	90
Footnote:								

NA = Not applicable because compound was not detected.

na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value

 $C_{chronic}$ = Chronic time-averaged concentration; HBSL = Chronic health-based screening level C_{acute} = Acute concentration; ATV = Acute toxicity value

Table D-2: Comparison of Air Concentrations With Health-Based Values: Volatile Organic Compounds

		155mm/pr	opelling c	harge DODIC	155mm propelling charge M3 (zone 3), M199 cannon DODIC: D540	M199 cannon		
Compound (a)	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (μg/m³)	Cacute/ ATV	> 1?
VOCs								
Dichlorodifluoromethane	NA	2.09E+02		na	NA	1.48E+07		na
Methyl Chloride	NA	1.07E+00		na	NA	2.06E+05		na
Dichlorotetrafluoroethane	NA	N		na	NA	AA		na
Vinyl Chloride	NA	2.20E-02	•	na	NA	1.28E+04		na
1,3-Butadiene	AN	3.74E-03		na	NA	2.20E+04		na
Methyl Bromide	NA	5.21E+00		na	NA	5.82E+04		na
Ethyl Chloride	AN	2.32E+00		na	NA	7.92E+06		na
Trichlorofluoromethane	NA	7.30E+02		na	NA	2.81E+06		па
1,1-Dichloroethene	1.46E-03	5.21E+02	2.80E-06	no	1.63E+00	7.92E+04	2.06E-05	01
Dichloromethane	4.16E-02	4.09E+00	1.02E-02	no	1.08E+02	6.96E+05	1.56E-04	no
3-Chloropropene	AN	1.04E+00		na	NA	9.39E+03		na
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	3.13E+04		na	NA	9.58E+06		na
1,1-Dichloroethane	NA	5.21E+02		na	NA NA	1.21E+06		na
cis-1,2-Dichloroethene	NA	3.65E+01		na	NA	7.92E+05		na
Trichloromethane	NA	8.35E-02		na	NA	9.76E+03		na
1,2-Dichloroethane	NA	7.39E-02		na	NA	8.08E+03		na
1,1,1-Trichloroethane	NA	1.04E+03		na	NA	1.94E+06		na
Benzene	1.59E-02	2.49E-01	6.39E-02	no	4.15E+01	1.56E+05	2.66E-04	no
Carbon Tetrachloride	NA	1.28E-01		na	NA	1.28E+05		na
1,2-Dichloropropane	NA	9.89E-02		na	NA	5.08E+05		na
Trichloroethene	NA	1.12E+00		na	NA	5.38E+05		na
cis-1,3-Dichloropropene	NA	5.17E-02		na	NA	1.14E+04		na
trans-1,3-Dichloropropene	NA	5.17E-02		na	AN	NA		na
1,1,2-Trichloroethane		1.20E-01		na	ΝΑ	1.64E+05		na
Toluene	1.08E-03	4.02E+02	2.69E-06	<u>و</u>	1.20E+00	1.88E+05	6.43E-06	no
1,2-Dibromoethane	NA	8.73E-03		na	NA	1.54E+05		na
Tetrachloroethene	NA	3.31E+00		na	NA	6.78E+05		na
Chlorobenzene	NA	6.21E+01		na	NA	1.38E+05		na
Ethylbenzene	NA	1.06E+03		na	Ϋ́	5.43E+05		na
m&p-Xylene	NA	7.30E+02		na	AN	6.51E+05		na

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Table D-2: Comparison of Air Concentrations With Health-Based Values: Volatile Organic Compounds

		່ນ ເປັນທີ່ສິນການ ເປັນທີ່	opelling c	harge	155mm propelling charge M3 (20he 3), M199 cannon DODIC: D540	лтээ саппон		
Compound (a)	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	Cacute (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 1?
Styrene	AN	1.06E+03		na	ΨN	2.13E+05		na
1,1,2,2-Tetrachloroethane	NA	3.31E-02		na	ΑΝ	2.06E+04		na
o-Xylene	NA	7.30E+02		na	NA	6.51E+05		na
4-Ethyltoluene	NA	NV		na	AN	1.25E+05		na
1,3,5-Trimethylbenzene	NA	6.21E+00		na	NA	3.68E+05		na
1,2,4-Trimethylbenzene	NA	6.21E+00		na	NA	1.80E+05		na
Benzyl Chloride	NA	3.96E-02		na	AN	5.20E+03		na
m-Dichlorobenzene	NA	3.29E+00		eu	AN	3.61E+04		na
p-Dichlorobenzene	NA	3.06E-01		na	Ä	6.61E+05		na
o-Dichlorobenzene	NA	2.09E+02		na	AN	3.01E+05		na
1,2,4-Trichlorobenzene	NA	2.08E+02		na	A	3.71E+04		na
Hexachtorobutadiene	NA	8.62E-02		na	AN	3.21E+04		na
Hydrocarbons								
Methane	5.35E-01	NV		na	2.39E+03	3.30E+06	7.24E-04	2
Ethane	NA	NV		na	Α¥	AA		na
Ethylene	NA	NV		na	AN	4.60E+05		na
Propane	NA	N		na	AN	3.78E+06		na
Acetylene	NA	№		na	NA	AA		na
Isobutane	NA	N		na	NA	9.52E+05		Б
n-Butane	AA	N		na	AN	5.71E+06		na
Propylene	NA	NV		eu	۸A	NA		na
Footnotes:								

NA = Not applicable

na = Not available because health-based screening value is not available or not applicable because compound was not detected.

NV = No value

Cchronic = Chronic time-averaged concentration

HBSL = Chronic health-based screening level

Cacute = Acute concentration

ATV = Acute toxicity value

Table D-3: Comparison of Air Concentrations With Health-Based Values: Semi-Volatile Organic Compounds

		155mm.b	ropelling	harge DODIC	155mm propelling charge M3 (zone 3), M199 čannon DODIC: D540	M99/Eanmon		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 12	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
SVOCs								
n-nitrosodimethylamine	NA	1.37E-04		na	NA	2.50E+03		na
bls(2-chloroethyl)ether	NA	5.82E-03		na	AN	5.85E+04		na
phenol	1.09E-04	2.19E+03	5.00E-08	no	4.89E-01	3.85E+04	1.27E-05	2
2-chlorophenol	NA	1.83E+01		na	AN	5.25E+03		na
1,3-dichlorobenzene	NA	3.29E+00		na	AN	3.61E+04		na
1,4-dichlorobenzene	NA	3.06E-01		na	NA	6.61E+05		na
1,2-dichlorobenzene	NA	2.09E+02		na	NA	3.01E+05		na
benzyl alcohol	NA	1.10E+03		· na	NA	5.53E+04		na .
bis(2-chloroisopropyl)ether	NA	1.92E-01		na	NA	6.99E+04		na
2-methylphenol	NA	1.83E+02		na	NA	NA		na
hexachloroethane	AA	4.80E-01		na	NA	2.90E+04		na
n-nitroso-di-n-propylamine	AA	9.61E-04		na	NA	2.00E+02		na
4-methylphenol	NA	1.83E+02		na	NA	AN		na
nitrobenzene	NA	2.09E+00		na	NA	1.51E+04		na
isophorone	NA	7.08E+00		na	NA	2.83E+04		na
2-nitrophenol	AN	2		na	NA	NA		na
2,4-dimethylphenol	AA	7.30E+01		na	NA	NA		na
bis(2-chloroethoxy)methane	NA	2		na	NA	NA		na
2,4-dichlorophenol	NA	1.10E+01		na	NA	3.00E+04		na
1,2,4-trichlorobenzene	NA	2.08E+02		na	NA	3.71E+04		na
naphthalene	2.17E-03	3.13E+00	6.93E-04	ou	9.68E+00	7.86E+04	1.23E-04	no
4-chloroaniline	AA	1.46E+01		na	Z A	3.00E+04		na
hexachlorobutadlene	NA	8.62E-02		na	NA	3.21E+04		na
4-chloro-3-methylphenol	NA	N/		na	NA A	2.00E+04		na
2-methylnaphthalene	NA	7.30E+01		na	NA	2.00E+04		na
hexachlorocyclopentadiene	NA	7.30E-02		na	NA	2.23E+02		na
2,4,6-trichlorophenol	NA	1.10E+02		na	NA	NA		na
2,4,5-trichlorophenol	AN	3.65E+02		na	ΝΑ	3.00E+04		na
2-chloronaphthalene	NA	2.92E+02		na	NA	6.00E+02		na
2-nitroaniline	AN	2.09E-01		na	NA	NA		na
dimethylphthalate	AN	3.65E+04		na	AA	1.50E+04		па
2,6-dinitrotoluene	AA	3.65E+00		па	AA	6.00E+02		na

Table D-3: Comparison of Air Concentrations With Health-Based Values: Semi-Volatile Organic Compounds

		105mm	ropelling	charge M3 (20 DODIC: D640	155mm propelling charge M3 (zone 3), M199 cannon - DODIC: D\$40	M199 cannon		
Compound	С _{сhronte} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 12	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Gacute/ ATV	> 12
3-nitroaniline	AN	N		'n	ΑN	9.00F+03		60
2,4-dinitrophenol	NA	7.30E+00		па	AN	7.50E+03		80
dibenzofuran	NA	1.46E+01		na	AN	NA		9
2,4-dinftrotoluene	NA	7.30E+00		na	ΑN	6.00E+02		2 6
4-nitrophenol	NA	2.92E+01		na	AN	3.00E+04		80
4-chlorophenyl-phenylether	NA	۸N		na	AN	NA		ec
diethylphthalate	NA A	2.92E+03		na	ΑN	1.50E+04		na L
4-nitroaniline	NA	N/		na	ΑN	9,00E+03		eu
4,6-dinitro-2-methyiphenol	NA	3.65E-01		ВП	AN	5.00E+02		eu
n-nitrosodiphenylamine(1)	NA	1.37E+00		na	NA	NA		e
4-bromophenyl-phenylether	٩N	NV		na	AN	AN		ec
hexachlorobenzene	NA NA	4.18E-03		na	AN	7.50E+01		na
pentachlorophenol	Y V	5.60E-02		na	ΑN	1.50E+03		na
di-n-butyiphthalate	NA	3.65E+02		na	ΑN	1.50E+04		na
butylbenzylphthalate	AA	7.30E+02		na	ΑN	5.00E+05		e c
bis(2-ethylhexyl)phthalate	4.07E-02	4.80E-01	8.48E-02	ou	4.24E+02	1.00E+04	4 24F-02	2
di-n-octylphthalate	NA	7.30E+01		na	NA	1.50E+05		a c
Footnotes:								

NA = Not applicable

na = Not available because health-based screening value is not available or not applicable because compound was not detected. NV = No value

Schronic = Chronic time-averaged concentration

HBSL = Chronic health-based screening level

Cacule = Acute concentration

ATV = Acute toxicity value

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		155min	r propelling	charge	155mim propelling charge M3 (zone 3), M199 cannon DODIC; D540	M199 cannon		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 12	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
PAHs								
acenaphthylene	3.09E-04	NV		na	1.38E+00	2.00E+02	6.89E-03	00
acenaphthene	3.19E-05	2.19E+02	1.46E-07	no	1.43E-01	1.25E+03	1.14E-04	no
fluorene	9.83E-05	1.46E+02	6.74E-07	no	4.39E-01	7.50E+04	5.86E-06	OL
phenanthrene	2.86E-04	N		na	1.28E+00	.2.00E+03	6.40E-04	no
anthracene	2.92E-05	1.10E+03	2.66E-08	ou '	1.30E-01	6.00E+03	2.17E-05	no
fluoranthene	1.93E-04	1.46E+02	1.32E-06	no	8.62E-01	3,00E+01	2.87E-02	no
pyrene	5.50E-04	1.10E+02	5.02E-08	no	2.45E+00	1.50E+04	1.64E-04	01
benzo(a)anthracene	1.21E-05	2.17E-02	5.56E-04	no	1.26E-01	6.00E+02	2.09E-04	OL
chrysene	1.20E-05	2.17E+00	5.53E-06	no	1.25E-01	2.00E+02	6.25E-04	01
benzo(b)fluoranthene	1.85E-05	2.17E-02	8.54E-04	no	4.83E-02	AN		na
benzo(k)fluoranthene	2.62E-05	2.17E-01	1.21E-04	no	6.82E-02	NA		na
benzo(a)pyrene	4.19E-05	2.17E-03	1.93E-02	u	4.36E-01	7.50E+03	5.82E-05	no
indeno(1,2,3-cd)pyrene	7.85E-05	2.17E-02	3.62E-03	no	2.04E-01	AN		na
dlbenz(a,h)anthracene	2.70E-06	2.17E-03	1.25E-03	no	2.82E-02	3.00E+04	9.39E-07	2
benzo(g,h,i)perylene	4.17E-04	N		na	1.86E+00	3.00E+04	6.21E-05	ou
Dioxins / Furans								
2378-Tetrachlorodibenzo-p-dloxin	1.17E-10	4.48E-08	2.61E-03	no	1.22E-06	3.50E+00	3.48E-07	no
12378-Pentachlorodibenzo-p-dioxin	8.34E-10	N		na	3.73E-06	2.50E+00	1.49E-06	no
123478-Hexachlorodibenzo-p-dioxin	1.25E-09	N		na	1.39E-06	NA		na
123678-Hexachlorodibenzo-p-dioxin	3.63E-09	N		na	1.62E-05	1.50E+01	1.08E-06	OU
123789-Hexachlorodibenzo-p-dioxin	1.48E-09	1.48E-06	1.00E-03	no	3.86E-06	NA		na
1234678-Heptachlorodibenzo-p-dioxin	7.11E-08	N		na	7.94E-05	NA		na
Octachlorodibenzo-p-dioxin	4.04E-07	N		na	4.51E-04	NA		na
2378-Tetrachlorodibenzo-p-furan	9.08E-11	S		na	4.06E-07	2.00E+00	2.03E-07	no
12378-Pentachlorodibenzo-p-furan	Ā	N		na	NA	NA		na
23478-Pentachlorodibenzo-o-furan	1.07E-10	N		na	4.80E-07	7.50E-02	6.40E-06	no
123478-Hexachlorodibenzo-p-furan	2.31E-10	N\		na	1.03E-06	7.50E+00	1.37E-07	2
123789-Hexachlorodibenzo-p-furan	NA	NV		na	NA	¥N.		na
234678-Hexachlorodibenzo-p-furan	NA	N		na	NA	1.50E+00		na
1234678-Heptachlorodibenzo-p-furan	2.53E-09	N		na	2.83E-06	AN.		na
1234789-Heptachlorodibenzo-p-furan	4.19E-10	N		na	4.68E-07	NA		na
OCDF	7.58E-09	N		na	8.46E-06	AN		na
Aldehydes								
Formaldehyde	NA	1.48E-01		na	NA	1.23E+03		na

Table D-4: Comparison of Air Concentrations With Health-Based Values: PAHs, Dioxins/Furans, Aidehydes, and Acid Gases

		165mm	i propelling	charge DODIC	155mm propelling charge M3 (zone 3); M199 cannon DODIC::D540, .)	M199 cannon		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronlc} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (μg/m³)	Cacute/ ATV	> 12
Acetaldehyde	NA	8.73E-01		na	NA	1.80E+04		na
Acetone	NA	3.65E+02		na	NA	2.37E+06		na
Acrolein	NA	2.09E-02		na	NA	2.30E+02		มล
Proprionaldehyde	NA	NV		na	۷A	7.50E+04		na
Crotonaldehyde	NA	3.54E-03		na	ΑN	5.72E+03		na
Butyraldehyde	AN	N/		' na	ΑN	7.38E+04		ВП
Benzaldehyde	NA	3.65E+02		na	AN	1.50E+04		na
Isovaleraldehyde	NA	N		na	NA	NA		na
Valeraldehyde	NA	N/		eu	NA	AN		na
o,m,p-Tolualdehyde	NA	N		na	AN	AN		na
Hexaldehyde	NA	N\		na	AN	ΑΝ		na
2,5-Dimethylbenzaldehyde	NA	N		eu	AN	ΝΑ		na
Acid Gases								
Hydrogen fluoride	NA	NV		na	AN	1.60E+03		na
Hydrogen chloride	NA	2.08E+01		na	AN	4.50E+03		na
Hydrogen bromide	AN	NV		na	AN	9.93E+03		na
Nitric Acid	NA	NV		na	NA	5.16E+03		na
Phosphoric acid	NA	1.04E+01		na	NA	3.00E+03		na
Sulfuric Acid	NA	NV		na	NA	2.00E+03		เลล

Footnote:

NA = Not applicable because compound was not detected.

na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value $C_{chronic}$ = Chronic time-averaged concentration; HBSL = Chronic health-based screening level

Cacute = Acute concentration; ATV = Acute toxicity value

Table D-5: Comparison of Air Concentrations With Health-Based Values: Cyanides and Energetics 100 meter location

100 Hierer 100ation								
		155mr	п ргорешид	charge DODIC	155mm propelling charge M3 (zone 3), M199 cannon DODIC: D540	/199 cannon		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chrontc} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
Particulate Cyanide and Hydrogen Cyanide (CN)								
Particulate Cyanide	NA	7.30E+01		na	AN	5.00E+03		na
Hydrogen Cyanide	5.95E-01	3.13E+00	1.90E-01	2	2.66E+03	5.17E+03	5.14E-01	ou
Energetics								
Nitrobenzene	NA	2.09E+00	-	na	ΑN	1.51E+04		na
2-Nitrotoluene	AN	3.65E+01		na	Α̈́	AA		na
3-Nitrotoluene	NA	3.65E+01		na	Ą	A V		na
4-Nitrotoluene	NA	3.65E+01		na	AN	3.37E+04		na
Nitroglycerine	۸A	4.80E-01		na	NA	Ą		na
1,3-Dinitrobenzene	NA	3.65E-01		na	AN	3.00E+03		na
2,6-Dinitrotoluene	NA	3.65E+00		na	NA	6.00E+02		na
2,4-Dinitrototuene	NA	7.30E+00		na	NA	6.00E+02		na
1,3,5-Trinitrobenzene	AA	1.10E+02		na	NA	3.00E+04		na
2,4,6-Trinitrotoluene	ΑΝ	2.24E-01		na	ΑN	2.50E+04		na
RDX	ΑĀ	6.11E-02		na	NA	NA		na
4-Amino-2,6-Dinitrotoluene	NA	N			AN	NA		
2-Amino-4,6-Dinitrotoluene	NA	NN			AA	1.50E+04		
Tetryl	AA	3.65E+01		na	AN	Ą		na
HMX	AA	1.83E+02		na	۸A	NA		na
Pentaerythritoltetranitrate	AA	N		na	NA	5.00E+01		na
Dibutyl phthalate	Y V	3.65E+02		na	AN	1.50E+04		na
Dioctyl phthalate	NA	4.80E-01		na	NA	1.00E+04		na
Diphenylamine	NA	9.13E+01		na	NA	3.00E+04		na

Footnote:

NA = Not applicable because compound was not detected.

na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value

Cchronic = Chronic time-averaged concentration; HBSL = Chronic health-based screening level

Cacute = Acute concentration; ATV = Acute toxicity value

Table D-6: Comparison of Air Concentrations With Health-Based Values: Total Petroleum Hydrocarbons 100 meter location

	155mm	l55mm propeiling charge M3 (zone 3), M199 cannon DODIC: D540	:harge M3 (zone 3), M198 DODIC: D540	Cannon
Compound (a)	Cehronic (µg/m³)	C _{chronic} (µg/m³)	Gehronic (µg/m³)	Cehronic (µg/m³)
	Allphatic:C<=8	Allphatic:C>8	Aromatic:C<≡8	Aromatic:C>8
Вепzепе	NA	NA	3.71E-02	NA
Toluene	AN	AN	1.08E-03	NA
naphthalene	NA	· NA	NA	2.17E-03
acenaphthylene	NA	NA	NA	3.09E-04
acenaphthene	NA	AN	AN	3.19E-05
fluorene	NA	AN	AA	9.83E-05
phenanthrene	NA	NA	NA	2.86E-04
anthracene	NA	NA	NA	2.92E-05
Total (µg/m³)	0.00E+00	0.00E+00	3.82E-02	2.92E-03
Derived Health-Based Screening Level	1.92E+04	1.04E+03	4.17E+02	2.09E+02
C _{chronic} /HBSL	0.00E+00	0.00E+00	9.16E-05	1.40E-05
>1?	no	no	no	ou

Footnotes:

>1? = Is the ratio greater than one?

NA = Not Applicable because compound was not detected

Cohronic = chronic averaged air Concentration (not adjusted for cancer averaging time of 70 years)

HBSL = Health-Based Screening Level

RISK EVALUATION DATA FOR CHARGE M3, FIRED FROM THE M199 CANNON, ZONE 3, 200 METERS DOWNWIND

Table D-7: Comparison of Air Concentrations With Health-Based Values: Gases, Particulates and Metals

200 meter location

ZOO IIIGIGI KOCALIOII		155min	1 propelling	charge	155mm propelling charge M3 (zone 3), M199 cannon DODIC: D540	M99 cannon		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronte} / HBSL	>12	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
Gases								
NH ₃	8.36E-01	1.04E+02	8.02E-03	ou	9.33E+02	1.75E+04	5.33E-02	2
Carbon Dloxide (CO ₂)	1.31E+01	N		na	5.83E+04	5.40E+07	1.08E-03	2
Carbon Monoxide (CO)	3.66E+01	1.57E+02	2.33E-01	2	4.09E+04	2.30E+05	1.78E-01	2
Nitrogen Oxides (as NO)	2.59E-01	1.00E+02	2.59E-03	ou	1.16E+03	2.70E+05	4.29E-03	no
Methane (CH4)	ΑN	N/		na	۷V	3.30E+06		na
Sulfur Dioxide (SO ₂)	NA	8.00E+01		เล	NA	7.89E+02		na
Combined Particulate								
TSP	1.69E+00	5.00E+01	3.38E-02	ou	1.89E+03	NA		na
PM ₁₀	1.28E+00	5.00E+01	2.56E-02	no	1.43E+03	NA		na
PM _{2.5}	5.02E-01	1.50E+01	3.34E-02	no	5.60E+02	NA		na
Metals								
Antimony	4.53E-11	1.46E+00	3.10E-11	no	2.02E-01	1.50E+03	1.35E-04	no
Arsenic	3.94E-05	4.47E-04	8.82E-02	no	4.10E-01	3.00E+01	1.37E-02	no
Barlum	2.36E-03	5.21E-01	4.53E-03	no	1.06E+01	1.50E+03	7.04E-03	no
Berylllum	NA	8.00E-04		na	NA	5.00E+00		na
Cadmlum	1.72E-05	1.07E-03	1.61E-02	no	1.79E-01	3.00E+01	5.97E-03	no
Chromlum	1.49E-04	1.53E-04	9.74E-01	ou	1.55E+00	1.50E+03	1.03E-03	no
Cobalt	3.01E-05	2.20E+02	1.37E-07	2	1.35E-01	6.00E+01	2.24E-03	ou
Copper	2.78E-01	1.46E+02	1.90E-03	on O	1.24E+03	3.00E+03	4.14E-01	no
Lead	5.44E-03	1.50E+00	3.62E-03	on O	2.43E+01	1.50E+02	1.62E-01	no
Manganese	1.00E-03	5.11E-02	1.96E-02	o C	4.47E+00	3.00E+03	1.49E-03	no
Nickel	6.23E-10	7.30E+01	8.54E-12	on	2.78E+00	3.00E+03	9.28E-04	no
Selenium	AN	1.83E+01		na	NA	6.00E+02		na
Silver	1.74E-11	1.83E+01	9.56E-13	ou	7.79E-02	3.00E+02	2.60E-04	ou
Thalllum	NA	2.56E-01		na	AN	3.00E+02		na
Zinc	3.98E-08	1.10E+03	3.63E-11	ou	1.78E+02	3.00E+04	5.92E-03	no

Footnote:

NA = Not applicable because compound was not detected.

na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value

 C_{chronic} = Chronic time-averaged concentration; HBSL = Chronic health-based screening level C_{scute} = Acute concentration; ATV = Acute toxicity value

1/16/01

Table D-8: Comparison of Air Concentrations With Health-Based Values: Volatile Organic Compounds

200 meter location								
		155mm o	opelling c	harge DODIC	155mm propelling charge M3 (zone 3), M199 cannon DODIC: D540	7199 cannon		
Compound (a)	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronle} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	G _{acute} / ATV	> 12
VOCs								
Dichlorodifluoromethane	ΑΝ	2.09E+02		na	NA	1.48E+07		na
Methyl Chloride	ΝΑ	1.07E+00		na	NA	2.06E+05		na
Dichlorotetrafluoroethane	ΑΝ	NV		na	NA NA	NA A		na
Vinyl Chloride	NA	2.20E-02	•	na	NA	1.28E+04		na
1,3-Butadiene	AN	3.74E-03		na	NA	2.20E+04		na
Methyl Bromide	ΑN	5.21E+00		na	NA	5.82E+04		na
Ethyl Chloride	NA	2.32E+00		na	NA	7.92E+06	,	na
Trichlorofluoromethane	NA	7.30E+02		na	NA	2.81E+06		na
1,1-Dichloroethene	5.82E-04	5.21E+02	1.12E-06	no	6.49E-01	7.92E+04	8.20E-06	no
Dichloromethane	1.66E-02	4.09E+00	4.05E-03	no	4.31E+01	6.96E+05	6.20E-05	no
3-Chloropropene	NA	1.04E+00		na	NA	9.39E+03		na
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	3.13E+04		na	NA	9.58E+06		na
1,1-Dichloroethane	AN	5.21E+02		na	NA	1.21E+06		na
cis-1,2-Dichloroethene	AN	3.65E+01		na	NA	7.92E+05		na
Trichloromethane	NA	8.35E-02		na	N A	9.76E+03		na
1,2-Dichloroethane	NA	7.39E-02		na	NA	8.08E+03		na
1,1,1-Trichloroethane	NA	1.04E+03		na	NA	1.94E+06		na
Benzene	6.34E-03	2.49E-01	2.55E-02	00	1.65E+01	1.56E+05	1.06E-04	20
Carbon Tetrachloride	NA	1.28E-01		na	ΑΝ	1.28E+05		na
1,2-Dichloropropane	NA	9.89E-02		na	NA	5.08E+05		na
Trichloroethene	NA	1.12E+00		na	NA	5.38E+05		na
cis-1,3-Dichloropropene	NA	5.17E-02		na	Y Y	1.14E+04		na
trans-1,3-Dichloropropene	NA	5.17E-02		na	NA	AA		na
1,1,2-Trichloroethane	NA	1.20E-01		na	AN	1.64E+05		na
Toluene	4.30E-04	4.02E+02	1.07E-06	2	4.80E-01	1.88E+05	2.56E-06	no
1,2-Dibromoethane	NA	8.73E-03		па	ΑΝ	1.54E+05		na
Tetrachloroethene	NA	3.31E+00		na	AN	6.78E+05		na
Chlorobenzene ∵.	NA	6.21E+01		na	NA NA	1.38E+05		na
Ethylbenzene	NA	1.06E+03		na	¥	5.43E+05		na
m&p-Хуlепе	NA NA	7.30E+02		na	AN N	6.51E+05		na

Table D-8: Comparison of Air Concentrations With Health-Based Values: Volatile Organic Compounds 200 meter location

COO HIGHER TOCATION				been seen and a second second	\$ 100 miles	The second secon		
		វីសិទ្ធាពា ស្រ	o Bulliedo	harge M3 (žo DODIC: D540	155mm propelling charge M3 (zone 3), M199 cannon DODIC: D540	//99 cannon		
Compound (a)	Cchronic (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronte} / HBSL	> 1?	Cacute (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
Styrene	AN	1.06E+03		na	ΑN	2.13E+05		na
1,1,2,2-Tetrachloroethane	NA	3.31E-02		na	NA	2.06E+04		na
o-Xylene	NA	7.30E+02		na	NA	6.51E+05		na
4-Ethyltoluene	NA	NN		na	NA	1.25E+05		na
1,3,5-Trimethylbenzene	NA	6.21E+00	•	na	NA	3.68E+05		na
1,2,4-Trimethylbenzene	NA	6.21E+00		na	NA	1.80E+05		na
Benzyi Chloride	NA	3.96E-02		na	NA	5.20E+03		na
m-Dichlorobenzene	NA	3,29E+00		na	NA	3.61E+04		na
p-Dichlorobenzene	NA	3.06E-01		na	NA	6.61E+05		na
o-Dichlorobenzene	NA	2.09E+02		na	NA	3.01E+05		na
1,2,4-Trichlorobenzene	NA	2.08E+02		na	NA.	3.71E+04		na
Hexachlorobutadiene	NA	8.62E-02		na	NA	3.21E+04		na
Hydrocarbons								
Methane	2.13E-01	N		na	9.52E+02	3.30E+06	2.88E-04	2
Ethane	NA	N<		na	NA	AN		na
Ethylene	NA	N<		na	NA	4.60E+05		na
Propane	NA .	N		na	NA	3.78E+06		na
Acetylene	NA	Š		na	NA	AN		na
Isobutane	AA	N N		na	NA	9.52E+05		na
n-Butane	AA	N N		na	NA	5.71E+06		na
Propylene	AA	S		na	NA	NA		na
Footnotes:								

-ootnotes:

NA = Not applicable

na = Not available because health-based screening value is not available or not applicable because compound was not detected.

NV = No value

Cehronic = Chronic time-averaged concentration

HBSL = Chronic health-based screening level

Cacute = Acute concentration

ATV = Acute toxicity value

Table D-9: Comparison of Air Concentrations With Health-Based Values: Semi-Volatile Organic Compounds 200 meter location

υ σ σ σ σ σ σ σ σ σ σ σ σ σ σ σ σ σ σ σ		Control of the Contro	A					一日本の日本のできる
	C _{chronic} (µg/m³)	Health-Based Screening Level	C _{chronic} / HBSL	> 12	Cacute (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 13
	AN AN	1.37E-04		na	NA	2.50E+03		na
	AN A	5.82E-03		na	ΑN	5.85E+04		na
	4.36E-05	2.19E+03	1.99E-08	2	1.95E-01	3.85E+04	5.05E-06	uo
	NA	1.83E+01		na	NA	5,25E+03		na
	ΝA	3.29E+00		na	AA	3.61E+04		na
	NA	3.06E-01		na	NA	6.61E+05		na
	AA	2.09E+02		na	AN	3.01E+05		na
	ΑN	1.10E+03		na	NA	5.53E+04		na
	ΑN	1.92E-01		na	NA	6.99E+04		na
	NA	1.83E+02		na	NA	NA		na
	NA	4.80E-01		na	NA	2.90E+04		na
	AN A	9.61E-04		na	NA	2.00E+02		na
	ΑA	1.83E+02		na	NA	NA		na
	Ν	2.09E+00		na	NA	1.51E+04		na
	NA	7.08E+00		na	NA	2.83E+04		na
	NA	N		na	NA	NA		na
	AA	7.30E+01		na	NA	NA		na
	NA	N		na	NA	NA		na
	NA	1.10E+01		na	NA	3.00E+04		na
	NA	2.08E+02		na	NA	3.71E+04		na
4-chloroaniline hexachlorobutadiene	8.63E-04	3.13E+00	2.76E-04	2	3.85E+00	7.86E+04	4.90E-05	2
hexachlorobutadiene	NA	1.46E+01		па	NA	3.00E+04		Ba
	NA	8.62E-02		na	AA	3.21E+04		na
4-chloro-3-methylphenol	NA	. AN		na	NA	2.00E+04		na
2-methylnaphthalene	NA	7.30E+01		na	NA	2.00E+04		na
hexachtorocyclopentadiene	NA	7.30E-02		na	NA	2.23E+02		na
2,4,6-trichlorophenol	NA	1.10E+02		na	. AN	AM		na
2,4,5-trichlorophenol	NA	3.65E+02		na	Ϋ́	3.00E+04		na
2-chloronaphthalene	NA	2.92E+02		па	ΑΝ	6.00E+02		na
2-nitroaniline	NA	2.09E-01		na	AA	٩		na
dimethylphthalate	NA	3.65E+04		na	NA NA	1.50E+04		na
2,6-dinitrotoluene	NA	3.65E+00		na	AN	6.00E+02		na

Table D-9: Comparison of Air Concentrations With Health-Based Values: Semi-Volatile Organic Compounds

		155ოա թ	ropelling	charge DODIC	155mm propelling charge M3 (zone 3), M199 cannon bObic: D540	#199 cannon		
Compound	Gehronic (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	C _{acuto} / ATV	> 1?
3-nitroaniline	ΑN	≥N		na	NA	9.00E+03		na
2,4-dinitrophenol	NA	7.30E+00		na	ΑN	7.50E+03		na
dlbenzofuran	NA	1.46E+01		na	ΑN	AN		na
2,4-dinitrotoluene	NA	7.30E+00		na	NA	6.00E+02		na
4-nitrophenol	NA	2.92E+01		na	NA	3.00E+04		na
4-chlorophenyl-phenylether	NA	N		na	NA	NA		na
diethylphthalate	AN	2.92E+03		na	AN	1.50E+04		na
4-nitroaniline	NA	N		na	. AN	9.00E+03		na
4,6-dinitro-2-methylphenol	NA	3.65E-01		na	NA	5.00E+02		na
n-nitrosodiphenylamine(1)	NA	1.37E+00		na	NA	NA		na
4-bromophenyl-phenylether	AN	N	,	na	NA	NA		na
hexachlorobenzene	AN	4.18E-03		na	NA	7.50E+01		na
pentachlorophenol	AA	5.60E-02		na	NA	1.50E+03		na
di-n-butyiphthalate	AN	3.65E+02		na	NA	1.50E+04		na
butylbenzylphthalate	AN	7.30E+02		na	NA	5.00E+05		na
bis(2-ethylhexyl)phthalate	1.62E-02	4.80E-01	3.38E-02	0L	1.69E+02	1.00E+04	1.69E-02	no
di-n-octylphthalate	NA	7.30E+01		na	NA	1.50E+05		na
- factions								

Footnotes:

NA = Not applicable

na = Not available because health-based screening value is not available or not applicable because compound was not detected.

NV = No value

Cchronic = Chronic time-averaged concentration HBSL = Chronic health-based screening level

Cacute = Acute concentration

ATV = Acute toxicity value

Table D-10: Comparison of Air Concentrations With Health-Based Values: PAHs, Dioxins/Furans, Aldehydes, and Acid Gases

Cchronic (µg/m 1.23E-04 1.27E-05 3.92E-05 1.14E-04 1.16E-05 7.69E-05 7.69E-05 7.37E-06 1.04E-05 1.04E-05 1.08E-06 1.06E-05 1.06E-01 1.04E-05 1.06E-01 1.04E-05 1.06E-01 1.04E-05 1.06E-01			Section Sections				
Cehronte (µg/m 1.23E-04 1.27E-05 3.92E-05 1.14E-04 1.16E-05 7.89E-05 7.37E-06 1.04E-05 1.04E-05 1.66E-04 4.96E-10 4.96E-10 2.83E-08 1.61E-07 3.32E-10 4.96E-11 3.32E-10 4.96E-11 3.32E-10 4.96E-11 3.32E-10 4.96E-11 3.32E-10 4.96E-11 3.32E-10 4.96E-11 3.32E-10 4.96E-11 3.42E-11	marson with the same of the College of the South South South South South	The second second second second second	חסח	DODIC: D540	A State of the sta	The state of the s	
	Health-Based (lg/m³) Screening Level	C _{chronic} / HBSL	> 12	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Gacute/ ATV	> 1?
		-					
			na	5.49E-01	2.00E+02	2.74E-03	20
)5 2.19E+02	5.81E-08	no	5.68E-02	1.25E+03	4.54E-05	2
)5 1.46E+02	2.68E-07	no	1.75E-01	7.50E+04	2.33E-06	ou
			na	5.09E-01	2.00E+03	2.55E-04	2
	1.10E+03	1.06E-08	no.	5.18E-02	6.00E+03	8,64E-06	on O
		5.27E-07	OU	3.43E-01	3.00E+01	1.14E-02	ou
)4 1.10E+02	2.00E-06	no	9.77E-01	1.50E+04	6.51E-05	OL OL
		2.21E-04	no	5.00E-02	6.00E+02	8.33E-05	no
		2.20E-06	no	4.98E-02	2.00E+02	2.49E-04	2
	06 2.17E-02	3.40E-04	no	1.92E-02	NA		na
		4.80E-05	no	2.71E-02	NA		na
		7.68E-03	no	1.74E-01	7.50E+03	2.32E-05	ou
		1.44E-03	10	8.14E-02	NA		na
	2.1	4.96E-04	ПО ПО	1.12E-02	3.00E+04	3.74E-07	ou
	74 NV		na	7.41E-01	3.00E+04	2.47E-05	no no
	4.4	1.04E-03	no n	4.86E-07	3.50E+00	1.39E-07	ou
			na	1.48E-06	2.50E+00	5.93E-07	no
			na	5.54E-07	NA		na
			na	6.45E-06	1.50E+01	4.30E-07	ou
	1.4	3.99E-04	<u>و</u>	1.54E-06	NA		na
			na	3.16E-05	NA		na
			na	1.80E-04	NA		Ba
			па	1.61E-07	2.00E+00	8.07E-08	20
			na	NA	NA		na
			na	1.91E-07	7.50E-02	2.55E-06	no
			na	4.10E-07	7.50E+00	5.47E-08	no
	2		na	AN	NA		na
4			na	ΑN	1.50E+00		na
			na	1.12E-06	NA		na
1234789-Heptachlorodibenzo-p-furan 1.67E-10			na	1.86E-07	NA		na
-)9 NV		na	3.37E-06	NA		na
Formaldehyde	1.48E-01	7	na	NA	1.23E+03		na

1/16/01

Table D-10: Comparison of Air Concentrations With Health-Based Values: PAHs, Dioxins/Furans, Aidehydes, and Acid Gases 200 meter location

		ujugg()	n propelling	charge DODIC	155mm propelling charge M3 (zone 3), M199 cannon DODIC: D540	(7189 carinon		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	G _{chronic} / HBSL	> 18	С _{асиte} (µg/m³)	Acute Toxicity Value (µg/m³)	Gacute/ ATV	> 12
Acetaldehyde	Ā	8.73E-01		na	ΑN	1.80E+04		na
Acetone	NA	3.65E+02		na	NA	2.37E+06		na
Acrolein	ΑN	2.09E-02		na	NA	2.30E+02		na
Proprionaldehyde	Ą	N		· na	NA	7.50E+04		na
Crotonaldehyde	NA A	3.54E-03		na	NA	5.72E+03		na
Butyraldehyde	NA	N		, na	NA	7.38E+04		na
Benzaldehyde	AN	3.65E+02		na	NA	1.50E+04		na
Isovaleraldehyde	NA	NV		na	NA	NA NA		na
Valeraldehyde	AA	N		na	NA	NA		na
o,m,p-Tolualdehyde	NA	NV		na	NA	NA		na
Hexaldehyde	NA	NV		na	ΑN	NA		na
2,5-Dimethylbenzaldehyde	NA	N		na	NA	NA		na
Acid Gases								
Hydrogen fluoride	AN	NV		na	AA	1.60E+03		na
Hydrogen chloride	AN	2.08E+01		ua	NA	4.50E+03		na
Hydrogen bromide	AN	N		na	NA	9.93E+03		na
Nitric Acid	AN	N		ua	AN	5.16E+03		na
Phosphoric acid	AN	1.04E+01		na	NA	3.00E+03		na
Sulfuric Acid	Ā	N/		na	NA	2.00E+03		na

Footnote:

NA = Not applicable because compound was not detected.

na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value

 C_{chronic} = Chronic time-averaged concentration; HBSL = Chronic health-based screening level C_{scute} = Acute concentration; ATV = Acute toxicity value

Table D-11: Comparison of Air Concentrations With Health-Based Values: Cyanides and Energetics

		155mi	n propelling	charge	155mm.propelling charge M3 (zone 3), M199 cannon DÓDIC: D540	W199 cannon			
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 12	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Gacute/ ATV	> 12	
Particulate Cyanide and Hydrogen Cyanide (CN)									
Particulate Cyanide	AN	7.30E+01		па	AN	5.00E+03		na	
Hydrogen Cyanide	2.37E-01	3.13E+00	7.57E-02	ou	1.06E+03	5.17E+03	2.05E-01	OU	
Energetics									
Nitrobenzene	NA	2.09E+00	•	na	ΑΝ	1.51E+04		na	
2-Nitrotoluene	NA	3.65E+01		na	NA	NA		na	
3-Nitrotoluene	NA	3.65E+01		na	AN	NA		na	
4-Nitrotoluene	NA	3.65E+01		na	AN	3.37E+04		na	
Nitroglycerine	NA	4.80E-01		na	NA	AN		na	
1,3-Dinitrobenzene	NA	3.65E-01		na	NA	3,00E+03		na	
2,6-Dinitrotoluene	NA	3.65E+00		na	NA	6.00E+02		na	
2,4-Dinitrotoluene	NA	7.30E+00		na	NA	6.00E+02		na	
1,3,5-Trinitrobenzene	NA	1.10E+02		na	NA	3.00E+04		na	
2,4,6-Trinitrotoluene	NA	2.24E-01		na	NA	2,50E+04		па	
RDX	NA	6.11E-02		na	NA	AN		ē	
4-Amino-2,6-Dinitrotoluene	AA	N			NA	AN			
2-Amino-4,6-Dinitrotoluene	NA	N			NA	1.50E+04			
Tetryl	NA	3.65E+01		na	NA	AN		na	
HMX	NA	1.83E+02		na	NA	NA		na	
Pentaerythritoltetranitrate	NA	N		na	NA	5.00E+01		na	
Dibutyl phthalate	NA	3.65E+02		na	NA	1.50E+04		na	
Dioctyl phthalate	NA	4.80E-01		na	NA	1,00E+04		na	
Diphenylamine	NA	9.13E+01		na	NA	3.00E+04		na	
P 1 1 1									

Footnote:

NA = Not applicable because compound was not detected.

na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value

Cohronic = Chronic time-averaged concentration; HBSL = Chronic health-based screening level

Cacute = Acute concentration; ATV = Acute toxicity value

Table D-12: Comparison of Air Concentrations With Health-Based Values: Total Petroleum Hydrocarbons 200 meter location

ZOO HIBIEL IOCAHOII					
	1.00 mm/s	oropelling charge DODIC	155mm propelling charge M3 (zone 3), M199 cannon DODIC: D540	Gannon	
Compound (a)	C _{chronte} (µg/m³)	C _{chronte} (µg/m³)	C _{chronic} (µg/m³)	Cehronic (µg/m³)	
	Allphatic:C<=8	Aliphatic:C>8	Aromatic:G<=8	Aromatic:C>8	
Benzene	AN	NA	1.48E-02	NA	
Toluene	AN	NA	4.30E-04	NA	
naphthalene	AN	-NA	NA	8.63E-04	
acenaphthylene	AN	NA	NA	1.23E-04	
acenaphthene	NA	AN	AN	1.27E-05	_
fluorene	NA	AN	NA	3.92E-05	
phenanthrene	NA	NA	NA	1.14E-04	
anthracene	NA	NA	NA	1.16E-05	
Total (µg/m³)	0.00E+00	0.00E+00	1.52E-02	1.16E-03	
Derived Health-Based Screening Level	1.92E+04	1.04E+03	4.17E+02	2.09E+02	
C _{chronlc} /HBSL	0.00E+00	0.00E+00	3.65E-05	5.58E-06	
>12	no	ou	no	ou	
ootnotes.					-

Footnotes:

>1? = Is the ratio greater than one?

NA = Not Applicable because compound was not detected

Cohronic = chronic averaged air Concentration (not adjusted for cancer averaging time of 70 years)

HBSL = Health-Based Screening Level

RISK EVALUATION DATA FOR CHARGE M3, FIRED FROM THE M284 CANNON, ZONE 3, 100 METERS DOWNWIND

Table D-13: Comparison of Air Concentrations With Health-Based Values: Gases, Particulates and Metals 100 meter location

		165min	n propelling	charge Debit	155mim propelling charge M3 (zone 3), M264 cannon DØDIC: D540	N284 cannon		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	>12	С _{асите} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
Gases								
NH ₃	2.22E+00	1.04E+02	2.13E-02	no	2.48E+03	1.75E+04	1.42E-01	ou
Carbon Dioxide (CO ₂)	3.81E+01	۸N		na	1.70E+05	5.40E+07	3.15E-03	100
Carbon Monoxide (CO)	9.87E+01	1.57E+02	6.29E-01	no	1.10E+05	2.30E+05	4.79E-01	2
Nitrogen Oxides (as NO)	7.96E-01	1.00E+02	7.96E-03	no	3.55E+03	2.70E+05	1.32E-02	OL
Methane (CH ₄)	NA	NV		na	AN	3.30E+06		na
Sulfur Dioxide (SO ₂)	NA	8.00E+01		na	NA	7.89E+02		na
Combined Particulate								
TSP	2.93E+00	5.00E+01	5.86E-02	20	3.27E+03	Ϋ́Α		ec
PM ₁₀	2.52E+00	5.00E+01	5.03E-02	00	2.81E+03	ΑN		na Eu
PM _{2.5}	1.35E+00	1.50E+01	8.97E-02	no Or	1.50E+03	¥2		80
Metals								
Antimony	NA	1.46E+00		na	ΑN	1.50E+03		na
Arsenic	7.83E-05	4.47E-04	1.75E-01	no	8.16E-01	3.00E+01	2.72E-02	02
Barlum	1.83E-03	5.21E-01	3.50E-03	no	8.15E+00	1.50E+03	5.44E-03	00
Beryllium	NA	8.00E-04		na	NA	5.00E+00		Ba
Cadmium	NA	1.07E-03		na	NA	3.00E+01		na
Chromlum	1.38E-04	1.53E-04	9.04E-01	20	1.44E+00	1.50E+03	9.59E-04	ou
Cobalt	5,44E-05	2.20E+02	2.47E-07	20	2.43E-01	6.00E+01	4.05E-03	100
Copper	1.70E-01	1.46E+02	1.16E-03	9	7.58E+02	3.00E+03	2.53E-01	ou
Lead	1.56E-02	1.50E+00	1.04E-02	2	6.96E+01	1.50E+02	4.64E-01	DD OL
Manganese	1.29E-03	5.11E-02	2.52E-02	2	5.75E+00	3.00E+03	1.92E-03	no
Nickel	5.59E-10	7.30E+01	7.66E-12	2	2.50E+00	3.00E+03	8.32E-04	OL
Selenium	AA	1.83E+01		na	NA	6.00E+02		na
Silver	AN	1.83E+01		na	NA	3.00E+02		na
Thallium	NA NA	2.56E-01		na	NA	3.00E+02		na
Zinc	2.97E-08	1.10E+03	2.72E-11	no	1.33E+02	3.00E+04	4.43E-03	no
Footnote:								

NA = Not applicable because compound was not detected.

na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value

 C_{chronic} = Chronic time-averaged concentration; HBSL = Chronic health-based screening level C_{acute} = Acute concentration; ATV = Acute toxicity value

Table D-14: Comparison of Air Concentrations With Health-Based Values: Volatile Organic Compounds

100 meter location								
		វិទី មាន	o Bulliedo	harge JODIC	155mm propelling charge M3 (zone 3), M284 cannon Dobic: D540	fi284 cannon		
Compound (a)	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	Cchronic/ HBSL	> 1?	Gacute (µg/m³)	Acute Toxicity Value (µg/m³)	G _{acute} / ATV	> 1?
VOCs								
Dichlorodifluoromethane	AN	2.09E+02		na	NA	1.48E+07		na
Methyl Chloride	AN	1.07E+00		na	NA	2.06E+05		na
Dichlorotetrafluoroethane	ΑN	N		na	NA	NA		na
Vinyi Chloride	۸A	2.20E-02	•	na	NA	1.28E+04		na
1,3-Butadlene	NA	3.74E-03		na	NA	2.20E+04		na
Methyl Bromide	NA	5.21E+00		na	NA	5.82E+04		na
Ethyl Chloride	NA	2.32E+00		na	NA	7.92E+06		na
Trichlorofluoromethane	NA	7.30E+02		na	NA	2.81E+06		na
1,1-Dichloroethene	1.73E-03	5.21E+02	3.33E-06	no	1.94E+00	7.92E+04	2.45E-05	no
Dichloromethane	6.69E-02	4.09E+00	1.64E-02	no	1.74E+02	6.96E+05	2.50E-04	no
3-Chloropropene	NA	1.04E+00		na	NA	9.39E+03		na
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	3.13E+04		na	NA	9.58E+06		na
1,1-Dichloroethane	NA	5.21E+02		na	NA	1.21E+06		na
cis-1,2-Dichloroethene	NA	3.65E+01		na	NA	7.92E+05		na
Trichioromethane	NA	8.35E-02		na	NA	9.76E+03		na
1,2-Dichloroethane	NA	7.39E-02		na	NA	8.08E+03		na
1,1,1-Trichloroethane	NA	1.04E+03		na	NA	1.94E+06		na
Вепzепе	1.35E-02	2.49E-01	5.43E-02	no	3.52E+01	1.56E+05	2.26E-04	no
Carbon Tetrachloride	NA	1.28E-01		па	۸A	1.28E+05		na
1,2-Dichloropropane	NA	9.89E-02		na	AN	5.08E+05		na
Trichloroethene	NA	1.12E+00		na	AA	5.38E+05		na
cls-1,3-Dichtoropropene	NA NA	5.17E-02		па	ΔA	1.14E+04		na
trans-1,3-Dichloropropene	NA	5.17E-02		na	NA	NA		na
1,1,2-Trichloroethane	NA	1.20E-01		na	NA	1.64E+05		na
Toluene	4.18E-04	4.02E+02	1.04E-06	no D	4.67E-01	1.88E+05	2.49E-06	no
1,2-Dibromoethane	NA	8.73E-03		na	AA	1.54E+05		na
Tetrachloroethene	NA	3.31E+00		na	A A	6.78E+05		na
Chlorobenzene	ΑΝ	6.21E+01		na	Ϋ́	1.38E+05		na
Ethylbenzene	ΝΑ	1.06E+03		na	Ϋ́	5.43E+05		na
m&p-Xylene	AA	7.30E+02		na	AA	6.51E+05		na

Table D-14: Comparison of Air Concentrations With Health-Based Values: Volatile Organic Compounds

			-	_				_	_	_				_		_		_	_		_	-	_	_
		> 1?	na	na	na	na	na	na	na	na	na	na	na	na		ou	na	na	na	na	na	na	na	
		Cacute/ ATV														5.85E-04								
	//284 cannon	Acute Toxicity Value (µg/m³)	2.13E+05	2.06E+04	6.51E+05	1.25E+05	3.68E+05	1.80E+05	5.20E+03	3.61E+04	6.61E+05	3.01E+05	3.71E+04	3.21E+04		3.30E+06	NA	4.60E+05	3.78E+06	NA	9.52E+05	5.71E+06	NA	
	155mm propelling charge M3 (zone 3), M284 cannon Dobic: D540	C _{acute} (µg/m³)	ΝΑ	AN	AN	AN	AN	۷A	NA	NA	NA	NA	ΑN	ΨN		1.93E+03	NA	NA	NA	NA	NA	NA	NA	
	charge DODIC	> 12	na	na	na	na	na	na	na	na	na	na	na	na		na	na	na	na	na	na	na	na	
	opalling.	C _{chronic} / HBSL																						
	d mimes)	Health-Based Screening Level (µg/m³)	1.06E+03	3.31E-02	7.30E+02	N	6.21E+00	6.21E+00	3.96E-02	3.29E+00	3.06E-01	2.09E+02	2.08E+02	8.62E-02		N	N	N	N	N	N	N	NV	
		C _{chronic} (µg/m³)	NA	AN	ΨN	۷N	AN	۷A	AN	AN	NA	AN	۷A	AN		4.32E-01	۸A	AN	NA	ΝΑ	NA	NA	NA	
100 meter location		Compound (a)	Styrene	1,1,2,2-Tetrachloroethane	o-Xylene	4-Ethyltoluene	1,3,5-Trimethylbenzene	1,2,4-Trimethylbenzene	Benzyl Chloride	m-Dichlorobenzene	p-Dichlorobenzene	o-Dichlorobenzene	1,2,4-Trichlorobenzene	Hexachlorobutadiene	Hydrocarbons	Methane	Ethane	Ethylene	Propane	Acetylene	Isobutane	n-Butane	Propylene	controlles.

Footnotes:

NA = Not applicable

na = Not available because health-based screening value is not available or not applicable because compound was not detected.

NV = No value

Cchronic = Chronic time-averaged concentration

HBSL = Chronic health-based screening level

Cacute = Acute concentration

ATV = Acute toxicity value

(*)* 4

Table D-15: Comparison of Air Concentrations With Health-Based Values: Semi-Volatile Organic Compounds

						2000		
		155mm p	ropelling	charge DODIC	155mm propelling charge M3 (20ne 3), M284 cannon DODIC; D540	M284 cannon		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronlc} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (μg/m³)	C _{acute} / ATV	> 12
SVOCs								
n-nitrosodimethylamine	NA	1.37E-04		na	NA	2.50E+03		na
bis(2-chloroethyl)ether	NA	5.82E-03		na	NA	5.85E+04		na
phenol	8.88E-04	2.19E+03	4.06E-07	no	3.97E+00	3.85E+04	1.03E-04	no
2-chlorophenol	NA	1.83E+01		na	AN	5.25E+03		na
1,3-dichlorobenzene	NA	3.29E+00		na	NA	3.61E+04		na
1,4-dichlorobenzene	NA	3.06E-01		na	NA	6.61E+05		na
1,2-dichlorobenzene	NA	2.09E+02		na	NA	3.01E+05		na
benzyl alcohol	NA	1.10E+03		na	NA	5.53E+04		na
bls(2-chlorolsopropyl)ether	NA	1.92E-01		na	NA	6.99E+04		na
2-methylphenot	NA	1.83E+02		na	NA	NA		na
hexachloroethane	NA	4.80E-01		na	NA	2.90E+04		na
n-nitroso-di-n-propylamine	NA	9.61E-04		na	NA	2.00E+02		na
4-methylphenol	NA	1.83E+02		na	NA	AA		na
nitrobenzene	NA	2.09E+00		na	NA	1.51E+04		na
isophorone	NA	7.08E+00		na	NA	2.83E+04		na
2-nitrophenol	ΝΑ	N		па	NA	AM		na
2,4-dimethylphenol	ΑN	7.30E+01		па	ΑĀ	NA		na
bis(2-chloroethoxy)methane	NA	≥ N		па	NA NA	ΝΑ		na
2,4-dichlorophenol	NA	1.10E+01		na	A A	3.00E+04		na
1,2,4-trichlorobenzene	ΝΑ	2.08E+02		na	NA	3.71E+04		na
naphthalene	2,40E-03	3.13E+00	7.68E-04	2	1.07E+01	7.86E+04	1.36E-04	2
4-chloroaniline	ΝΑ	1.46E+01		na	AN	3.00E+04		na
hexachlorobutadiene	ΑΝ	8.62E-02		na	AA	3.21E+04		na
4-chloro-3-methylphenol	ΑA	Ž.		na	NA	2.00E+04		na
2-methylnaphthalene	ΑΝ	7.30E+01		na	A'A	2.00E+04		na
hexachlorocyclopentadiene	NA	7.30E-02		na	NA	2.23E+02		na
2,4,6-trichlorophenol	A A	1.10E+02		na	NA	NA		na
2,4,5-trichlorophenol	NA	3.65E+02		na	NA	3.00E+04		na
2-chtoronaphthalene	NA NA	2.92E+02		na	NA	6.00E+02		na
2-nitroanlline	AA A	2.09E-01		na	NA	AA		na
dimethylphthalate	NA	3.65E+04		na	NA	1.50E+04		na
2,6-dinitrotoluene	AN	3.65E+00		na	NA	6.00E+02		na

Table D-15: Comparison of Air Concentrations With Health-Based Values: Semi-Volatile Organic Compounds

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		155mm p	ropelling	Sharge	155mm propelling,dharge M3 (zone 3), M284 cannon อัตอิเตะ bริสัช	/284 carinon		
Compound	С _{сһгопіс} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	Cacute (µg/m³)	Acute Toxicity Value (µg/m³)	Gacute/ ATV	> 12
3-nitroaniline	NA A	AN.		na	NA	9.00E+03		na
2,4-dinitrophenol	ΝA	7.30E+00		na	NA	7.50E+03		na
dlbenzofuran	AN	1.46E+01		na	NA	NA		na
2,4-dinitrotoluene	NA	7.30E+00		na	NA	6.00E+02		na
4-nitrophenol	ΑN	2.92E+01		na	NA	3.00E+04		na
4-chlorophenyl-phenylether	ΑN	N/		na	NA	NA		na
diethylphthalate	ΑN	2.92E+03		na	AN	1.50E+04		na
4-nitroaniline	AN	N/		na	NA	9.00E+03		na
4,6-dinitro-2-methylphenol	AN	3.65E-01		na	NA	5.00E+02		na
n-nitrosodiphenylamine(1)	NA	1.37E+00		na	NA	NA		na
4-bromophenyl-phenylether	NA	N\		na	NA	NA		na
hexachlorobenzene	ΑN	4.18E-03		na	NA	7.50E+01		na
pentachlorophenol	AN	5.60E-02		na	NA	1.50E+03		na
di-n-butylphthalate	۸N	3.65E+02		na	NA	1.50E+04		na
butylbenzylphthalate	ΑN	7.30E+02		na	NA	5.00E+05		na
bis(2-ethylhexyl)phthalate	1.93E-02	4.80E-01	4.03E-02	no	2.01E+02	1.00E+04	2.01E-02	no
dl-n-octylphthalate	NA	7.30E+01		na	NA	1.50E+05		na

Footnotes:

NA = Not applicable and the second of the second of the second second of the second of

NV = No value

Cehronic = Chronic time-averaged concentration

HBSL = Chronic health-based screening level

C_{scute} = Acute concentration ATV = Acute toxicity value

Table D-16: Comparison of Air Concentrations With Health-Based Values: PAHs, Dioxins/Furans, Aldehydes, and Acid Gases

		155mr	n propelling	charge	155mm propelling charge M3 (zone 3), M284 cannon DODIC: D540	0284 cannon		
Compound	С _{сhronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	, 5	C _{acute} (µg/m³)	Acute Toxicity Value (μg/m³)	Cacute/ ATV	> 13
PAHS								
acenaphthylene	3.86E-04	N N		na	1.72E+00	2.00E+02	8.62E-03	00
acenaphthene	8.92E-05	2.19E+02	4.07E-07	ou	3.98E-01	1.25E+03	3.19E-04	ou
fluorene	1.37E-04	1.46E+02	9.42E-07	SI OI	6.14E-01	7.50E+04	8.19E-06	no
phenanthrene	2.52E-04	N		na	1.12E+00	2.00E+03	5.62E-04	01
anthracene	3.89E-05	1.10E+03	3.56E-08	ou .	1.74E-01	6.00E+03	2.90E-05	OU
fluoranthene	1.31E-04	1.46E+02	8.98E-07	no	5.86E-01	3.00E+01	1.95E-02	no
pyrene	3.68E-04	1.10E+02	3.36E-06	no	1.64E+00	1,50E+04	1.10E-04	01
benzo(a)anthracene	1.11E-05	2.17E-02	5.12E-04	no	1.16E-01	6.00E+02	1.93E-04	no
chrysene	1.08E-05	2.17E+00	4.97E-06	on O	1.12E-01	2.00E+02	5.61E-04	no
benzo(b)fluoranthene	2.41E-05	2.17E-02	1.11E-03	ou	6.27E-02	ΝΑ		na
benzo(k)fluoranthene	2.02E-05	2.17E-01	9.32E-05	no	5.27E-02	NA		na
benzo(a)pyrene	3.88E-05	2.17E-03	1.79E-02	2	4.05E-01	7.50E+03	5.39E-05	92
indeno(1,2,3-cd)pyrene	6.03E-05	2.17E-02	2.78E-03	no	1.57E-01	AA		na
dibenz(a,h)anthracene	1.49E-06	2.17E-03	6.88E-04	OU	1.55E-02	3.00E+04	5.18E-07	OL OL
benzo(g,h,l)perylene	3.34E-04	N		na	1.49E+00	3.00E+04	4.97E-05	OL
Dioxins / Furans								
2378-Tetrachlorodibenzo-p-dioxin	2.18E-10	4.48E-08	4.87E-03	no	2.27E-06	3.50E+00	6.49E-07	OU.
12378-Pentachlorodibenzo-p-dioxin	Ϋ́	N		na	NA	2.50E+00		na
123478-Hexachlorodibenzo-p-dioxin	AN	N/		na	AN	NA		na
123678-Hexachlorodibenzo-p-dioxin	4.04E-10	N		na	1.81E-06	1.50E+01	1.20E-07	ou
123789-Hexachlorodibenzo-p-dloxin	6.98E-11	1.48E-06	4.72E-05	20	1.82E-07	NA		na
1234678-Heptachlorodibenzo-p-dloxin	3.68E-09	N		na	4.10E-06	NA		na
Octachlorodibenzo-p-dioxin	2.90E-08	N		na	3.24E-05	NA		na
2378-Tetrachlorodibenzo-p-furan	3.28E-10	N		na	1.47E-06	2.00E+00	7.33E-07	OU
12378-Pentachlorodibenzo-p-furan	NA	N	_	na	NA	NA		na
23478-Pentachlorodibenzo-o-furan	1.53E-10	Š		na	6.82E-07	7.50E-02	9.09E-06	on O
123478-Hexachlorodibenzo-p-furan	2.71E-10	N		na	1.21E-06	7.50E+00	1.61E-07	01
123789-Hexachlorodibenzo-p-furan	AA	N		na	NA	NA		na
234678-Hexachlorodibenzo-p-furan	AN A	≥		na	NA	1.50E+00		na
1234678-Heptachlorodibenzo-p-furan	1.23E-09	N		na	1.37E-06	NA		na
1234789-Heptachlorodibenzo-p-furan	NA.	N		na	NA	NA		na
OCDF	1.51E-09	N		na	1.69E-06	AN		na
Aldehydes								
Formaldehyde	NA	1.48E-01		na	AN AN	1.23E+03		na

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Table D-16: Comparison of Air Concentrations With Health-Based Values: PAHs, Dioxins/Furans, Aldehydes, and Acid Gases

		155mr	n propelling	charge DODIC	155mm propelling charge M3 (zone 3), M284 cannon DODIC: D540	#284 cannon		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 17	С _{асиїе} (µg/m³)	Acute Toxicity Value (μg/m³)	Cacute/ ATV	> 12
Acetaldehyde	AN	8.73E-01		na	NA	1.80E+04		na
Acetone	ΑΝ	3.65E+02		na	NA	2.37E+06		na
Acrolein	ΑN	2.09E-02		na	NA	2.30E+02		na
Proprionaldehyde	N A	N		na	NA	7.50E+04		na
Crotonaldehyde	ΑN	3.54E-03		na	NA	5.72E+03		na
Butyraldehyde	ΝΑ	NN		, na	NA	7.38E+04		na
Benzaldehyde	AN	3.65E+02		na	NA	1.50E+04		na
Isovaleraldehyde	ΑN	۸N		na	NA	NA		na
Valeraldehyde	ΑN	NN		na	NA	NA		na
o,m,p-Tolualdehyde	AN	۸N		na	NA	NA		na
Hexaldehyde	۸N	۸N		na	NA	AN		na
2,5-Dimethylbenzaldehyde	ΑN	۸N		na	NA	NA		na
Acid Gases								
Hydrogen fluoride	NA	NV		na	NA	1.60E+03		na
Hydrogen chloride	ΑN	2.08E+01		na	NA	4.50E+03		na
Hydrogen bromide	NA	۸N		na	NA	6.93E+03		na
Nitric Acid	ΝΑ	NΛ		na	NA	5.16E+03		na
Phosphoric acid	AN	1.04E+01		na	NA	3.00E+03		na
Sulfuric Acid	1.41E-01	NV		na	1.58E+02	2.00E+03	7.88E-02	no
Lookoto								

Footnote:

NA = Not applicable because compound was not detected.

na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value

Cohronic = Chronic time-averaged concentration; HBSL = Chronic health-based screening level

Cacute = Acute concentration; ATV = Acute toxicity value

Table D-17: Comparison of Air Concentrations With Health-Based Values: Cyanides and Energetics

100 meter location								
		155mr	n probelling	charge DODI(155mm propelling charge M3 (zone 3), M284 cannon DØDIC: D540	M284 cannon		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	G _{chronic} / HBSL	> 17	C _{ecute} (µg/m³)	Acute Toxicity Value (μg/m³)	Cacute/ ATV	> 17
Particulate Cyanide and Hydrogen Cyanide (CN)								
Particulate Cyanide	NA	7.30E+01		na	NA	5.00E+03		na
Hydrogen Cyanide	8.86E-01	3.13E+00	2.83E-01	ou	3.96E+03	5.17E+03	7.65E-01	2
Energetics								
Nitrobenzene	NA	2.09E+00	•	na	NA	1.51E+04		na
2-Nitrotoluene	NA	3.65E+01		na	NA	AN		na
3-Nitrotoluene	NA	3.65E+01		na	NA	NA		па
4-Nitrotoluene	NA	3.65E+01		na	AN	3.37E+04		na
Nitroglycerine	NA	4.80E-01		na	AN	ΑN		na
1,3-Dinitrobenzene	NA	3.65E-01		na	NA	3.00E+03		na
2,6-Dinitrotoluene	NA	3.65E+00		na	NA	6.00E+02		na
2,4-Dinitrotoluene	NA	7.30E+00		na	NA	6.00E+02		na
1,3,5-Trinitrobenzene	NA	1.10E+02		na	NA	3.00E+04		na
2,4,6-Trinitrotoluene	NA	2.24E-01		na	NA	2.50E+04		na
RDX	NA	6.11E-02		na	NA	AN		na
4-Amino-2,6-Dinitrotoluene	NA	N			NA	AN		
2-Amino-4,6-Dinitrotoluene	NA	N			NA	1.50E+04		
Tetryl	NA	3.65E+01		na	NA	NA		na
HMX	AN	1.83E+02		na	NA	NA		na
Pentaerythritoltetranitrate	NA	N N		na	NA	5.00E+01		na
Dibutyl phthalate	NA	3.65E+02		na	NA	1.50E+04		na
Dioctyl phthalate	NA	4.80E-01		มล	NA	1.00E+04		na
Diphenylamine	NA	9.13E+01		na	NA	3.00E+04		na
-cotrote:								

Footnote:

NA = Not applicable because compound was not detected.

na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value

Contoute = Chronic time-averaged concentration; HBSL = Chronic health-based screening level

Cacute = Acute concentration; ATV = Acute toxicity value

Table D-18: Comparison of Air Concentrations With Health-Based Values: Total Petroleum Hydrocarbons 100 meter location

	(192mm)	oropelling charge DODIC	155mm propelling charge M3 (zone 3), M284 cannon DGDIC: D540	4 cannon
Compound (a)	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)
	Aliphatic:C<=8	Allphatic:C>8	Aromatic:C<=8	Aromatic:C>8
Benzene	NA	NA	3.16E-02	NA
Toluene	NA	NA	4.18E-04	AN
naphthalene	NA	· NA	NA	2.40E-03
acenaphthylene	NA	NA	NA	3.86E-04
acenaphthene	AN	NA	NA	8.92E-05
fluorene	AN	AN	NA	1.37E-04
phenanthrene	ΝΑ	NA	NA	2.52E-04
anthracene	NA	NA	NA	3.89E-05
Total (µg/m³)	0.00E+00	0.00E+00	3.20E-02	3.30E-03
Derived Health-Based Screening Level	1.92E+04	1.04E+03	4.17E+02	2.09E+02
C _{chronic} /HBSL	0.00E+00	0.00E+00	7.66E-05	1.58E-05
>15	no	no	ou	ou
ootnotes: 17 = Is the ratio greater than one?	1, 24,			
IA = Not Applicable because compound was not detected	cred			

NA = Not Applicable because compound was not detected Cohronic = chronic averaging time of 70 years) HBSL = Health-Based Screening Level

D-28

RISK EVALUATION DATA FOR CHARGE M3, FIRED FROM THE M284 CANNON, ZONE 3, 200 METERS DOWNWIND

Table D-19: Comparison of Air Concentrations With Health-Based Values: Gases, Particulates and Metals

200 Hetel location		Access		AKALAN.	8 10 (man 0) 1	foot comme		
			n propening	DODIC	DODIC: D540	iteot callion		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	С _{асите} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
Gases								
NH ₃	8.85E-01	1.04E+02	8.49E-03	on.	9.88E+02	1.75E+04	5.65E-02	no
Carbon Dioxide (CO ₂)	1.52E+01	N<		па	6.78E+04	5.40E+07	1.25E-03	2
Carbon Monoxide (CO)	3.93E+01	1.57E+02	2.50E-01	no	4.39E+04	2.30E+05	1.91E-01	no
Nitrogen Oxides (as NO)	3.17E-01	1.00E+02	3.17E-03	no	1.41E+03	2.70E+05	5.24E-03	no
Methane (CH₄)	NA	N		na	NA	3.30E+06		na
Sulfur Dloxide (SO ₂)	NA	8.00E+01		na	AN A	7.89E+02		na
Combined Particulate								
TSP	1.17E+00	5.00E+01	2.33E-02	no	1.30E+03	NA		na
PM ₁₀	1.00E+00	5.00E+01	2.00E-02	ou	1.12E+03	AN		na
PM _{2.5}	5.36E-01	1.50E+01	3.57E-02	ou	5.98E+02	ĄN		na
Metals								
Antimony	NA	1.46E+00		na	۸A	1.50E+03		na
Arsenic	3.12E-05	4.47E-04	6.98E-02	no	3.25E-01	3.00E+01	1.08E-02	no
Barlum	7.27E-04	5.21E-01	1.39E-03	no	3.25E+00	1.50E+03	2.16E-03	no
Beryllium	NA	8.00E-04		na	NA	5.00E+00		na
Cadmium	NA	1.07E-03		na	NA	3.00E+01		na
Chromium	5.49E-05	1.53E-04	3.60E-01	no	5.73E-01	1.50E+03	3.82E-04	no
Cobalt	2.16E-05	2.20E+02	9.84E-08	no	9.67E-02	6.00E+01	1.61E-03	no
Copper	6.76E-02	1.46E+02	4.63E-04	no	3.02E+02	3.00E+03	1.01E-01	no
Lead	6.20E-03	1.50E+00	4.14E-03	no	2.77E+01	1.50E+02	1.85E-01	no
Manganese	5.12E-04	5.11E-02	1.00E-02	no	2.29E+00	3.00E+03	7.63E-04	no
Nickel	2.23E-10	7.30E+01	3.05E-12	no	9.94E-01	3.00E+03	3.31E-04	no
Selenium	NA	1.83E+01		na	NA	6.00E+02		na
Silver	NA	1.83E+01		na	AN	3.00E+02		na
Thallium	NA NA	2.56E-01		na	NA	3.00E+02		na
Zinc	1.18E-08	1.10E+03	1.08E-11	no	5.29E+01	3.00E+04	1.76E-03	no

Footnote:

NA = Not applicable because compound was not detected.

na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value

Conronc = Chronic time-averaged concentration; HBSL = Chronic health-based screening level

Cacute = Acute concentration; ATV = Acute toxicity value

M3risk1.xls

Table D-20: Comparison of Air Concentrations With Health-Based Values: Volatile Organic Compounds 200 meter location

200 meter location								
		155mm p	opelling c	harge DODIC	155mm propelling charge M3 (zone 3), M284 cannon DODIC: D540	//284 cannon		
Compound (a)	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	С _{асиtе} (µg/m³)	Acute Toxicity Value (µg/m³)	C _{acute} / ATV	> 1?
VOCs								
Dichlorodifluoromethane	NA	2.09E+02		na	NA	1.48E+07		na
Methyl Chloride	NA	1.07E+00		na	NA	2.06E+05		na
Dichlorotetrafluoroethane	NA	N		na	NA	ΑA		na
Vinyl Chloride	NA	2.20E-02	•	na	NA	1.28E+04		na
1,3-Butadiene	NA	3.74E-03		na	NA	2.20E+04		na
Methyl Bromide	NA	5.21E+00		na	NA	5.82E+04		na
Ethyl Chloride	NA	2.32E+00		na	AN	7.92E+06		na
Trichlorofluoromethane	NA	7.30E+02		na	NA	2.81E+06		na
1,1-Dichloroethene	6.91E-04	5.21E+02	1.32E-06	no	7.71E-01	7.92E+04	9.74E-06	2
Dichloromethane	2.66E-02	4.09E+00	6.52E-03	no	6.94E+01	6.96E+05	9.97E-05	5
3-Chloropropene	NA	1.04E+00		na	NA	9.39E+03		na
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	3.13E+04		na	NA	9.58E+06		na
1,1-Dichloroethane	NA	5.21E+02		na	NA	1.21E+06		na
cls-1,2-Dichloroethene	NA	3.65E+01		na	NA	7.92E+05		na
Trichloromethane	NA	8.35E-02		na	NA	9.76E+03		na
1,2-Dichloroethane	NA	7.39E-02		na	NA	8.08E+03		na
1,1,1-Trichloroethane	NA	1.04E+03		na	NA	1.94E+06		na
Вепzепе	5.38E-03	2.49E-01	2.16E-02	uo	1.40E+01	1.56E+05	8.99E-05	no
Carbon Tetrachloride	NA	1.28E-01		na	NA	1.28E+05		na
1,2-Dichloropropane	NA	9.89E-02		na	NA	5.08E+05		na
Trichloroethene	NA	1.12E+00		na	NA	5.38E+05		na
cls-1,3-Dichloropropene	NA	5.17E-02		na	NA	1.14E+04		na
trans-1,3-Dichloropropene	AN	5.17E-02		na	NA	NA		na
1,1,2-Trichloroethane	AN	1.20E-01		na	NA	1.64E+05		na
Toluene	1.67E-04	4.02E+02	4.15E-07	no	1.86E-01	1.88E+05	9.91E-07	no
1,2-Dibromoethane	NA	8.73E-03		na	NA	1.54E+05		na
Tetrachloroethene	NA	3.31E+00		na	NA	6.78E+05		na
Chlorobenzene	NA	6.21E+01		na	ΝΑ	1.38E+05		na
Ethylbenzene	NA	1.06E+03		na	۸A	5.43E+05		na
m&p-Xylene	NA	7.30E+02		na	AN	6.51E+05		na

Table D-20; Comparison of Air Concentrations With Health-Based Values: Volatile Organic Compounds

		155mm pr	o Bullledo	harge M3 (zo DODIC: D540	155mm propelling charge M3 (2one 3), M284 cannon DODIC: D540	1284 cannon		
Compound (a)	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronlc} / HBSL	> 12	C _{acute} (µg/m³)	Acute Toxicity Value (μg/m³)	Cacute/ ATV	> 12
Styrene	NA	1.06E+03		na	NA	2.13E+05		na
1,1,2,2-Tetrachloroethane	AN	3.31E-02		na	NA	2.06E+04		na
o-Xylene	NA	7.30E+02		na	NA	6.51E+05		na
4-Ethyltoluene	NA	N		na	NA	1.25E+05		na
1,3,5-Trimethylbenzene	NA	6.21E+00	•	na	NA	3.68E+05		na
1,2,4-Trimethylbenzene	NA	6.21E+00		na	NA	1.80E+05		na
Benzyl Chloride	NA	3.96E-02		na	NA	5.20E+03		na
m-Dichlorobenzene	NA	3.29E+00		na	NA	3.61E+04		na
p-Dichlorobenzene	NA	3.06E-01		na	NA	6.61E+05		na
o-Dichlorobenzene	NA	2.09E+02		na	NA	3.01E+05		na
1,2,4-Trichlorobenzene	NA	2.08E+02		na	NA	3.71E+04		na
Hexachlorobutadlene	NA	8.62E-02		na	NA	3.21E+04		na
Hydrocarbons								
Меthane	1.72E-01	N		na	7.69E+02	3.30E+06	2.33E-04	no
Ethane	NA	NV		na	NA	NA		na
Ethylene	NA	N		na	NA	4.60E+05		na
Propane	NA	N		na	NA	3.78E+06		na
Acetylene	NA	N<		na	NA	NA		na
Isobutane	NA	> <u>N</u>		na	AA	9.52E+05		na
n-Butane	NA	>2		na	AA	5.71E+06		na
Propylene	NA	N N		na	NA	NA		na

Footnotes:

NA = Not applicable

na = Not available because health-based screening value is not available or not applicable because compound was not detected.

NV = No value

Cehronic = Chronic time-averaged concentration

HBSL = Chronic health-based screening level

Cacute = Acute concentration

ATV = Acute toxicity value

Table D-21: Comparison of Air Concentrations With Health-Based Values: Semi-Volatile Organic Compounds

		155mm p	ropalling	charge DODIC	155mm propelling charge M3 (zone 3), M284 cannon DODIC: D540	M284 cannon		
Compound	С _{снгонс} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 13	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
SVOCs								
n-nitrosodimethylamine	ΑN	1.37E-04		na	NA	2.50E+03		na
bis(2-chloroethyl)ether	NA	5.82E-03		na	AN	5.85E+04		na
lonehq	3.54E-04	2.19E+03	1.61E-07	no	1.58E+00	3.85E+04	4.10E-05	OL
2-chlorophenol	NA	1.83E+01		na	NA	5.25E+03		na
1,3-dichlorobenzene	ΑΝ	3.29E+00		na	NA	3.61E+04		na
1,4-dichlorobenzene	NA	3.06E-01		na	NA	6.61E+05		na
1,2-dichlorobenzene	NA	2.09E+02		na	NA	3.01E+05		na
benzyl alcohol	NA	1.10E+03		na	NA	5.53E+04		na
bls(2-chloroisopropyl)ether	NA	1.92E-01		na	NA	6.99E+04		na
2-methylphenol	NA	1.83E+02		na	NA	NA		na
hexachloroethane	NA	4.80E-01		na	NA	2.90E+04		na
n-nitroso-di-n-propylamine	NA	9.61E-04		na	NA	2.00E+02		na
4-methylphenol	NA	1.83E+02		na	NA	AN		na
nitrobenzene	NA	2.09E+00		na	NA	1.51E+04		na
Isophorone	NA	7.08E+00		na	NA	2.83E+04		na
2-nitrophenol	NA	N		na	NA	NA		na
2,4-dimethylphenol	NA	7.30E+01		na	NA	NA		na
bls(2-chloroethoxy)methane	NA	N		na	NA	NA		na
2,4-dichlorophenol	NA	1.10E+01		na	NA	3.00E+04		na
1,2,4-trichlorobenzene	NA	2.08E+02		na	NA	3.71E+04		na
naphthalene	9.56E-04	3.13E+00	3.06E-04	no	4.27E+00	7.86E+04	5.43E-05	no
4-chloroaniline	ΑĀ	1.46E+01		na	NA	3.00E+04		na
hexachlorobutadiene	ΝΑ	8.62E-02		na	NA	3.21E+04		na
4-chloro-3-methylphenol	NA	N		na	NA	2.00E+04		na
2-methylnaphthalene	۸A	7.30E+01		na	NA	2.00E+04		na
hexachlorocyclopentadlene	AA	7.30E-02		na	NA	2.23E+02		na
2,4,6-trichiorophenol	ΝΑ	1.10E+02		na	NA	NA		na
2,4,5-trichlorophenol	NA	3.65E+02		na	NA	3.00E+04		na
2-chloronaphthalene	ΝΑ	2.92E+02		na	NA	6.00E+02		na
2-nitroaniline	NA	2.09E-01		na	NA	NA		na
dimethylphthalate	NA	3.65E+04		na	NA	1.50E+04		na
2,6-dinitrotoluene	A A	3.65E+00		na	NA	6.00E+02		na

Table D-21: Comparison of Air Concentrations With Health-Based Values: Semi-Volatile Organic Compounds

		155mm p	ropelling	sharge Dobic	155mm propelling charge M3 (zone 3), M284 cannon D@DIC: D540	#284 cannon		
Compound	Cehronic (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronte} / HBSL	> 12	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	G _{acute} / ATV	> 1?
3-nitroaniline	ΑN	≥N		na	AN	9.00E+03		na
2,4-dinitrophenol	AN	7.30E+00		na	NA	7.50E+03		na
dlbenzofuran	۸A	1.46E+01		na	NA	AN		na
2,4-dinitrotoluene	NA	7.30E+00		na	NA	6.00E+02		na
4-nitrophenol	AN	2.92E+01		na	NA	3.00E+04		na
4-chlorophenyl-phenylether	NA	N/		na	NA	AN		na
diethylphthalate	NA	2.92E+03		na	NA	1.50E+04		na
4-nitroaniline	NA	N/		na	NA	9.00E+03		na
4,6-dinitro-2-methylphenol	NA	3.65E-01		na	NA	5.00E+02		na
n-nitrosodiphenylamine(1)	NA	1.37E+00		na	NA	NA		na
4-bromophenyl-phenylether	NA	N		na	NA	NA		na
hexachlorobenzene	NA	4.18E-03		na	NA	7.50E+01		na
pentachlorophenol	NA	5.60E-02		na	NA	1.50E+03		na
dl-n-butylphthalate	AN	3.65E+02		na	NA	1.50E+04		na
butylbenzylphthalate	NA	7.30E+02		na	NA	5.00E+05		na
bis(2-ethylhexyl)phthafate	7.70E-03	4.80E-01	1.60E-02	no	8.02E+01	1.00E+04	8.02E-03	no
di-n-octylphthalate	NA	7.30E+01		na	NA	1.50E+05		na
- cotrotoo								

Footnotes:

NA = Not applicable

na = Not available because health-based screening value is not available or not applicable because compound was not detected. NV = No value

C_{chronic} = Chronic time-averaged concentration

HBSL = Chronic health-based screening level

Cacute = Acute concentration

ATV = Acute toxicity value

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Table D-22: Comparison of Air Concentrations With Health-Based Values: PAHs, Dioxins/Furans, Aldehydes, and Acid Gases

> 12 na 5 E g na na 20 пa 2 na па na g na 2 na no na no no 2 na 2 2 ဥ 2 2 2 na 2 2 2 2 Cacute/ ATV 3.62E-06 1.98E-05 6.43E-08 2.15E-05 4.79E-08 3.43E-03 4.37E-05 2.92E-07 1.27E-04 3.26E-06 2.24E-04 1.15E-05 7.77E-03 7.67E-05 2.23E-04 2.06E-07 2.59E-07 Acute Toxicity Value (µg/m³) 155mm propelling charge M3 (zone 3), M284 cannon 1.23E+03 7,50E+00 2.50E+00 1.50E+00 7.50E+03 3.50E+00 2.00E+00 2.00E+02 1.25E+03 7.50E+04 2.00E+03 6.00E+03 1.50E+04 6.00E+02 3,00E+04 3.00E+04 1.50E+01 7.50E-02 3.00E+01 2.00E + 02₹Ž ¥ ¥ Ϋ́ ¥ Z ₹ ž ₹ ΑN Cacute (µg/m³) 6.55E-01 4.60E-02 1.29E-05 7.24E-08 1.63E-06 2.71E-07 4.82E-07 6.92E-02 4.47E-02 2.50E-02 2.10E-02 1.61E-01 6.25E-02 6.19E-03 9.05E-07 5.83E-07 5.47E-07 6.71E-07 6.87E-01 1.59E-01 2.44E-01 4.47E-01 2.33E-01 5.93E-01 7.19E-07 ž Ϋ́ Ž Ž Ϋ́ ž DODIC: DS40 > 12 na 2 Па a na na g na na B g 2 2 2 na ш na 20 2 2 2 5 10 na Па 2 2 2 2 2.04E-04 1.98E-06 1.62E-07 3.75E-07 3.71E-05 7.13E-03 1.11E-03 1.88E-05 1.42E-08 1.34E-06 4.42E-04 2.74E-04 1.94E-03 3.58E-07 C_{chronlc}/ HBSL Screening Level Health-Based 1.48E-01 .10E+03 1.46E+02 1.10E+02 2.17E+00 4.48E-08 48E-06 2.19E+02 1,46E+02 2.17E-02 2.17E-02 2.17E-03 2.17E-02 2.17E-03 (hg/m₃) 2.17E-01 ⋛ ⋛ N ⋛ ≥ ⋛ ⋛ ⋛ ⋛ ž ≥ ⋛ ⋛ ⋛ C_{chronte} (µg/m³) 1.61E-10 1.46E-09 1.15E-08 1.31E-10 .08E-10 4.90E-10 6.01E-10 4.42E-06 1.55E-05 5.22E-05 4.29E-06 9.58E-06 8.05E-06 1.55E-05 2.40E-05 1.33E-04 3.55E-05 5.47E-05 1.47E-04 5.94E-07 2.78E-11 6.08E-11 1.00E-04 8.68E-11 ΑA ¥ ٤ Ž AN ¥ 1234678-Heptachlorodibenzo-p-dloxin 1234789-Heptachlorodibenzo-p-furan 1234678-Heptachlorodibenzo-p-furan 123478-Hexachlorodibenzo-p-dloxin 123678-Hexachlorodibenzo-p-dioxin 123789-Hexachlorodibenzo-p-dioxin 123789-Hexachlorodibenzo-p-furan 234678-Hexachlorodibenzo-p-furan 123478-Hexachlorodibenzo-p-furan 12378-Pentachlorodibenzo-p-dloxin 12378-Pentachlorodibenzo-p-furan 23478-Pentachlorodibenzo-o-furan 2378-Tetrachlorodibenzo-p-furan 2378-Tetrachlorodibenzo-p-dloxin Octachlorodibenzo-p-dloxin 200 meter location Indeno(1,2,3-cd)pyrene dibenz(a,h)anthracene benzo(b)fluoranthene benzo(k)fluoranthene benzo(g,h,l)perylene benzo(a)anthracene Dioxins / Furans benzo(a)pyrene Formaldehyde acenaphthylene acenaphthene phenanthrene Aldehydes Compound fluoranthene anthracene chrysene fluorene OCDF pyrene PAHS

1/16/01

Table D-22: Comparison of Air Concentrations With Health-Based Values: PAHs, Dioxins/Furans, Aldehydes, and Acid Gases

		155mn	n propelling	r charge Dodic	155mm propelling charge M3 (zone 3), M284 canhon DØDIC: D540	W284 canhon		
Compound	. С _{енголіс} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronte} / HBSL	> 12	С _{асиіе} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
Acetaldehyde	AN	8.73E-01		na	NA	1.80E+04		na
Acetone	ΑN	3.65E+02		na	NA	2.37E+06		na
Acrolein	NA	2.09E-02		na	NA	2.30E+02		na
Proprionaldehyde	AN	N		na	NA	7.50E+04		na
Crotonaldehyde	NA	3.54E-03		na	NA	5.72E+03		na
Butyraldehyde	NA	NV		, na	NA	7.38E+04		na
Benzaldehyde	AN	3.65E+02		na	NA	1.50E+04		na
Isovaleraldehyde	NA	NV		na	NA	NA		na
Valeraldehyde	NA	N<		na	NA	NA		na
o,m,p-Tolualdehyde	NA	N\		na	NA	AN		na
Hexaldehyde	NA	NN		na	NA	۷N		na
2,5-Dimethylbenzaldehyde	NA	NV		na	NA	NA		na
Acid Gases								
Hydrogen fluoride	NA	NN.		na	NA	1.60E+03		na
Hydrogen chloride	NA	2.08E+01		na	NA	4.50E+03		na
Hydrogen bromide	NA	N		na	NA	6.93E+03		na
Nitric Acid	NA	NN		na	NA	5.16E+03		na
Phosphoric acid	NA	1.04E+01		na	NA	3.00E+03		na
Sulfuric Acld	5.62E-02	N		na	6.27E+01	2.00E+03	3.14E-02	no

Footnote:

NA = Not applicable because compound was not detected.

na = Not.available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value

Cehronic = Chronic time-averaged concentration; HBSL = Chronic health-based screening level

Cacule = Acute concentration; ATV = Acute toxicity value

Table D-23: Comparison of Air Concentrations With Health-Based Values: Cyanides and Energetics

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γm³) Ac Va	Acute Toxicity Value (µg/m³) 5.00E+03 5.17E+03 1.51E+04 NA NA NA NA NA NA NA NA	Acute Toxicity Value (µg/m³) 5.00E+03 5.17E+03 1.51E+04 NA	Acute Toxicity Value (µg/m³) 5.00E+03 5.17E+04 1.51E+04 NA NA NA NA NA 3.37E+04 NA	Acute Toxicity Value (μg/m³) 5.00E+03 5.17E+04 1.51E+04 NA									
				- + 5 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	(a) (b) (c) (c) (c) (d)	(a) (b) (c) (c) (c) (d) (d) (d) (d) (d) (d) (d) (d) (d) (d	2 3 6 6 8 8 8 8 9 8 9 8 8 8 8 8 8 8 8 8 8 8				17E+00 NA NA N	00E+03 17E+03 17E+04 NA NA 00E+04 00E+04 00E+04 NA NA NA NA NA NA NA NA NA NA NA NA NA	NA N
1.58E+03 NA NA	HA HA	80	m		- - - - - - - - - - - - - - - - - - - 				5.0 5.1 5.1 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0	5.17E 5.17E 5.17E 5.00E 6.00E 6.00E 7.50E 7.50E	5.00E+05 5.17E+06 1.51E+04 NA 3.37E+06 6.00E+05 6.00E+06 6.00E+06 6.00E+06 7.50E+06 8.00E+06 8.00E+06 1.50E+06 NA NA NA NA NA NA NA NA NA NA NA NA NA	5.00E+03 5.17E+03 1.51E+04 NA 3.37E+04 NA 3.00E+02 6.00E+02 6.00E+02 6.00E+04 2.50E+04 NA NA NA NA NA NA NA NA NA NA	5.00E+03 5.17E+04 NA NA 3.00E+04 6.00E+02 6.00E+04 2.50E+04 NA NA NA NA NA NA NA NA NA NA NA NA NA
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3.65E+01	3.65E+01 3.65E+01	3.65E+01 3.65E+01 4.80E-01	3.65E+01 3.65E+01 4.80E-01 3.65E-01	3.65E+01 3.65E+01 4.80E-01 3.65E-03	3.65E+01 3.65E+01 4.80E-01 3.65E-01 7.30E+00	3.65E+01 3.65E+01 4.80E-01 3.65E-01 7.30E+00 1.10E+02	3.65E+01 3.65E+01 4.80E-01 3.65E-01 3.65E-00 7.30E+00 1.10E+02	3.65E+01 3.65E+01 4.80E-01 3.65E-00 7.30E+00 1.10E+02 2.24E-01 6.11E-02	3.65E+01 3.65E+01 4.80E-01 3.65E+00 7.30E+00 1.10E+02 6.11E-02	3.65E+01 3.65E+01 4.80E-01 3.65E+00 7.30E+00 1.10E+02 2.24E-01 N/ N/ N/ N/ S-65E+01 3.65E+01 3.65E+01	3.65E+01 3.65E+01 3.65E+01 3.65E-01 7.30E+00 1.10E+02 0.11E-02 NV NV NV 3.65E+01 1.83E+02	35E+01 35E+01 30E+01 30E+00 30E+00 NV NV NV NV	10 10 10 10 10 10 10 10
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Footnote:

NA = Not applicable because compound was not detected.

na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value

Cohronic = Chronic time-averaged concentration; HBSL = Chronic health-based screening level

Cacuta = Acute concentration; ATV = Acute toxicity value

Table D-24: Comparison of Air Concentrations With Health-Based Values: Total Petroleum Hydrocarbons 200 meter location

TOURSE IOCATION				
	155mm	propelling charge DODIC	155mm propelling charge M3 (zone 3), M284 cannon DODIC: D540	4 cannon
Compound (a)	Gehronic (µg/m³)	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)
	Allphatic:C<=8	Allphatic:C>8	Aromatic:C<=8	Aromatic:C>8
Benzene	NA	NA	1.26E-02	NA
Toluene	NA	NA	1.67E-04	NA
naphthalene	NA	· NA	AA	9.56E-04
acenaphthylene	NA	AN	NA	1.54E-04
acenaphthene	NA	NA	NA	3.55E-05
fluorene	AN	AN	NA	5.47E-05
phenanthrene	AN	NA	NA	1.00E-04
anthracene	NA	NA	NA	1.55E-05
Total (µg/m³)	0.00E+00	0.00E+00	1.27E-02	1.32E-03
Derived Health-Based Screening Level	1.92E+04	1.04E+03	4.17E+02	2.09E+02
C _{chronic} /HBSL	0.00E+00	0.00E+00	3.05E-05	6.31E-06
>1?	no	no	no	ou
Footnotes: >1? = Is the ratio greater than one?				
NA = Not Applicable because compound was not detected	cted			
	•			

C_{chronic} = chronic averaged air Concentration (not adjusted for cancer averaging time of 70 years) HBSL = Health-Based Screening Level

RISK EVALUATION DATA FOR CHARGE M3, FIRED FROM THE M199 CANNON, ZONE 5, 100 METERS DOWNWIND

Table D-25: Comparison of Air Concentrations With Health-Based Values: Gases, Particulates and Metals

		155mm) propelling	charge	155mm propelling charge M3 (zone 5), M199 cannon DODIC; D540	/199 cannon		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 12	Cacute (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	>12
Gases								
NH3	4.47E+00	1.04E+02	4.29E-02	no	4.99E+03	1.75E+04	2.85E-01	ou
Carbon Dioxide (CO ₂)	5.75E+01	N.		na	2.57E+05	5.40E+07	4.75E-03	01
Carbon Monoxide (CO)	1,51E+02	1.57E+02	9.63E-01	no	1.69E+05	2.30E+05	7.34E-01	no
Nitrogen Oxides (as NO)	2.09E+00	1.00E+02	2.09E-02	no	9.35E+03	2.70E+05	3.46E-02	no
Methane (CH4)	ΑN	N<		na	NA	3.30E+06		na
Sulfur Dioxide (SO ₂)	ΑN	8.00E+01		na	NA	7.89E+02		na
Combined Particulate								
TSP	6.25E+00	5.00E+01	1.25E-01	no	6.98E+03	AN		na
PM ₁₀	4.47E+00	5.00E+01	8.93E-02	ou	4.99E+03	NA		na
PM _{2.5}	1.77E+00	1.50E+01	1.18E-01	no	1.97E+03	NA		na
Metals								
Antimony	1.55E-10	1.46E+00	1.06E-10	ou	6.94E-01	1.50E+03	4.63E-04	no
Arsenic	1.48E-04	4.47E-04	3.30E-01	ou	1.54E+00	3.00E+01	5.13E-02	no
Barlum	3.38E-03	5.21E-01	6.49E-03	ou	1.51E+01	1.50E+03	1.01E-02	no
Berylllum	NA	8.00E-04		na	NA	5.00E+00		na
Cadmlum	5.05E-05	1.07E-03	4.73E-02	9	5.26E-01	3.00E+01	1.75E-02	no
Chromium	3.18E-04	1.53E-04	2.09E+00	yes	3.32E+00	1.50E+03	2.21E-03	no
Cobalt	9.38E-05	2.20E+02	4.27E-07	ou	4.19E-01	6.00E+01	6.98E-03	OU
Copper	8.50E-01	1.46E+02	5.82E-03	2	3.79E+03	3.00E+03	1.26E+00	yes
Lead	1.70E-02	1.50E+00	1.13E-02	2	7.58E+01	1.50E+02	5.05E-01	no
Manganese	4.17E-03	5.11E-02	8.17E-02	2	1.86E+01	3.00E+03	6.21E-03	no
Nickel	1.39E-09	7.30E+01	1.90E-11	2	6.20E+00	3.00E+03	2.07E-03	no
Selenium	NA	1.83E+01		na	Ä	6.00E+02		na
Silver	5.71E-11	1.83E+01	3.13E-12	2	2.55E-01	3.00E+02	8.50E-04	on O
Thalllum	NA	2.56E-01		na	Y Y	3.00E+02		na
Zinc	1.34E-07	1.10E+03	1.22E-10	임	5.96E+02	3.00E+04	1.99E-02	no
potnote:								

Footnote:

NA = Not applicable because compound was not detected.

na = Not available because health-based screening value is not available or not applicable if compound was not detected. NV = No value

Cchronic = Chronic time-averaged concentration; HBSL = Chronic health-based screening level

Cacute = Acute concentration; ATV = Acute toxicity value

Table D-26: Comparison of Air Concentrations With Health-Based Values: Volatile Organic Compounds

		185mm pr	opelling c	sharge NB (zo	155mm propelling charge M3 (zone 5), M199 cannon กิดคาณ 1540	M99 cannon		
Compound (a)	G _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronlc} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	>12
VOCs								
Dichlorodifluoromethane	AN	2.09E+02		na	AA	1.48E+07		na
Methyl Chloride	AN	1.07E+00		na	AN	2.06E+05		na
Dichlorotetrafluoroethane	AN	N		na	AN	NA		na
Vinyl Chloride	NA	2.20E-02	•	na	ΝA	1.28E+04		na
1,3-Butadlene	NA	3.74E-03		na	NA	2.20E+04		na
Methyl Bromide	NA	5.21E+00		na	NA	5.82E+04		na
Ethyl Chloride	NA	2.32E+00		na	NA	7.92E+06		na
Trichlorofluoromethane	NA	7.30E+02		na	NA	2.81E+06		na
1,1-Dichloroethene	1.39E-03	5.21E+02	2.67E-06	no	1.56E+00	7.92E+04	1.97E-05	no
Dichloromethane	3.51E-02	4.09E+00	8.58E-03	no	9.14E+01	6.96E+05	1.31E-04	no
3-Chloropropene	NA	1.04E+00		na	AN	9.39E+03		na
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	3.13E+04		na	NA	9.58E+06		na
1,1-Dichloroethane	NA	5,21E+02		na	NA	1.21E+06		na
cis-1,2-Dichloroethene	NA	3.65E+01		na	NA	7.92E+05		na
Trichloromethane	NA	8.35E-02		na	NA	9.76E+03		na
1,2-Dichloroethane	NA	7.39E-02		na	NA	8.08E+03		na
1,1,1-Trichloroethane	NA	1.04E+03		na	NA	1.94E+06		na
Benzene	1.77E-02	2.49E-01	7.11E-02	no	4.61E+01	1.56E+05	2.96E-04	no
Carbon Tetrachloride	NA	1.28E-01		na	NA	1.28E+05		na
1,2-Dichloropropane	AN	9.89E-02		na	NA	5.08E+05		na
Trichloroethene	NA	1.12E+00		na	NA	5.38E+05		na
cls-1,3-Dichloropropene	NA	5.17E-02		na	NA	1.14E+04		na
trans-1,3-Dichloropropene	NA	5.17E-02		na	NA	AN		na
1,1,2-Trichloroethane	NA NA	1.20E-01		na	NA NA	1.64E+05		na
Toluene	1.15E-03	4.02E+02	2.85E-06	no	1.28E+00	1.88E+05	6.82E-06	no
1,2-Dibromoethane	AN	8.73E-03		na	NA	1.54E+05		na
Tetrachloroethene	NA	3.31E+00		na	۸	6.78E+05		na
Chlorobenzene	NA AN	6.21E+01		na	Ϋ́	1.38E+05		na
Ethylbenzene	ΝΑ	1.06E+03		na	NA A	5,43E+05		na
m&p-Xylene	Y Y	7.30E+02		na	NA	6.51E+05		na

Table D-26: Comparison of Air Concentrations With Health-Based Values: Volatile Organic Compounds

TOU MOTOR TOCATION		,	The state of the s					
		155mm pr	opeilling of	harge M3 (zo) Dodic: D540	155inim propelling charge M3 (zone 5), M199 cannon DODIC: D540	M99 cannon		
		Health-Based	7			Acute Toxicity		
Compound (a)	Cchronic (µg/m³)	Screening Level (µg/m³)	HBSL	× 1~	Cacute (µg/m³)	Value (µg/m³)	C _{acute} / ATV	× 12
Styrene	A V	1.06E+03		na	ĀN	2,13E+05		na
1,1,2,2-Tetrachloroethane	AN	3.31E-02		na	NA	2.06E+04		na
o-Xylene	NA	7.30E+02		na	NA	6.51E+05		na
4-Ethyltoluene	NA	N		na	NA	1.25E+05		na
1,3,5-Trimethylbenzene	NA	6.21E+00	•	na	NA	3.68E+05		na
1,2,4-Trimethylbenzene	NA	6.21E+00		na	NA	1.80E+05		na
Benzyl Chloride	NA	3.96E-02		na	NA	5.20E+03		na
m-Dichlorobenzene	NA	3.29E+00		na	NA	3.61E+04		na
p-Dichlorobenzene	AN	3.06E-01		na	NA	6.61E+05		na
o-Dichlorobenzene	NA	2.09E+02		na	NA	3.01E+05		na
1,2,4-Trichlorobenzene	AN	2.08E+02		na	NA	3.71E+04		na
Hexachlorobutadlene	NA	8.62E-02		na	NA	3.21E+04		na
Hydrocarbons								
Methane	9.69E-01	NV		na	4.33E+03	3.30E+06	1.31E-03	ou
Ethane	NA	N N		na	NA	AN		na
Ethylene	NA	NV		na	NA	4.60E+05		na
Propane	NA	N/		na	NA	3.78E+06		na
Acetylene	NA	N<		na	NA	NA		na
Isobutane	NA	N		na	NA	9.52E+05		na
n-Butane	NA	N		na	NA	5.71E+06		na
Propylene	NA	N		na	NA	NA		na
oota oo								

Footnotes: NA = Not applicable

na = Not available because health-based screening value is not available or not applicable because compound was not detected.

NV = No value

C_{chronic} = Chronic time-averaged concentration

HBSL = Chronic health-based screening level

Cacute = Acute concentration

ATV = Acute toxicity value

Table D-27: Comparison of Air Concentrations With Health-Based Values: Semi-Volatile Organic Compounds

		155mm p	ropelling	Harge	155mm propelling charge M3 (zone 5), M199 cannon	1199 cannon		
				DODIC	: D540		A Kiloman Care Care	
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	>1?	C _{acute} (µg/m³)	Acute Toxicity Value (μg/m³)	Cacute/ ATV	> 12
SVOCs								
n-nitrosodimethylamine	NA	1.37E-04		na	NA	2.50E+03		na
bis(2-chloroethyl)ether	NA	5.82E-03		na	AN	5.85E+04		na
phenol	1.75E-03	2.19E+03	8.01E-07	no	7.84E+00	3.85E+04	2.04E-04	no
2-chlorophenol	AN	1.83E+01		na	AN	5,25E+03		na
1,3-dichlorobenzene	ΑN	3.29E+00		na	NA	3.61E+04		na
1,4-dichlorobenzene	NA	3.06E-01		na	NA	6.61E+05		na
1,2-dichlorobenzene	AN	2.09E+02		na	NA	3.01E+05		na
benzyl alcohol	NA	1.10E+03		na	NA	5.53E+04		na
bis(2-chlorolsopropyl)ether	NA	1.92E-01		na	NA	6.99E+04		. na
2-methylphenol	NA	1.83E+02		na	NA	NA		na
hexachloroethane	NA	4.80E-01		na	NA	2.90E+04		na
n-nitroso-di-n-propylamine	NA	9.61E-04		na	NA	2.00E+02		na
4-methylphenol	NA	1.83E+02		na	NA	AN		na
nitrobenzene	NA	2.09E+00		na	NA	1.51E+04		na
Isophorone	NA	7.08E+00		na	AA	2.83E+04		na
2-nitrophenol	NA	N		na	¥	ΑΝ		na
2,4-dimethylphenol	AN	7.30E+01		na	Ϋ́	Ā		na
bis(2-chloroethoxy)methane	NA	Š		na	AA	ΑN		na
2,4-dichlorophenol	NA	1.10E+01		na	AA	3.00E+04		na
1,2,4-trichlorobenzene	NA	2.08E+02		na	AA A	3.71E+04		na
naphthalene	1.16E-03	3.13E+00	3.70E-04	2	5.17E+00	7.86E+04	6.58E-05	00
4-chtoroanlline	NA	1.46E+01		па	NA	3.00E+04		пa
hexachlorobutadiene	NA	8.62E-02		na	ΑA	3.21E+04		na
4-chloro-3-methylphenol	NA	N		na	AA	2.00E+04		na
2-methylnaphthalene	NA	7.30E+01		na	NA	2.00E+04		na
hexachlorocyclopentadiene	NA	7.30E-02		na	NA	2.23E+02		na
2,4,6-trichlorophenol	NA	1.10E+02		na	NA	NA		na
2,4,5-trichlorophenol	NA NA	3.65E+02		na	NA	3.00E+04		na
2-chloronaphthalene	NA	2.92E+02		na	AA	6.00E+02		na
2-nitroaniline	NA	2.09E-01		na	NA	Ϋ́		na
dimethyiphthalate	NA	3.65E+04		na	A A	1.50E+04		na
2,6-dinitrotoluene	NA	3.65E+00		na	AA	6.00E+02		na

Table D-27: Comparison of Air Concentrations With Health-Based Values: Semi-Volatile Organic Compounds

		185mm p	ropalling	charge DODIC	185mm propelling charge M3 (zone 6), M199 cannon DODIC: D540	A199 cannon		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronle} / HBSL	> 1?	Cacute (µg/m³)	Acute Toxicity Value (µg/m³)	Gacute/ ATV	> 1?
3-nitroaniline	Ϋ́	≥ N		na	AN	9.00E+03		na
2,4-dinitrophenol	NA AN	7.30E+00		na	NA	7.50E+03		na
dibenzofuran	AN	1.46E+01		na	۸A	۷V		na
2,4-dinitrotoluene	AN	7.30E+00		na	NA	6.00E+02		na
4-nitrophenol	NA	2.92E+01		na	NA	3,00E+04		na
4-chlorophenyl-phenylether	AN	۸N		na	NA	AN		na
diethylphthalate	NA	2.92E+03		na	NA	1.50E+04		na
4-nitroaniline	NA	N		na	NA	9.00E+03		na
4,6-dinitro-2-methylphenol	NA	3.65E-01		na	NA	5.00E+02		na
n-nitrosodiphenylamine(1)	NA	1.37E+00		na	NA	NA		na
4-bromophenyl-phenylether	NA	NN		na	NA	AN		na
hexachlorobenzene	NA	4.18E-03		na	NA	7.50E+01		na
pentachlorophenol	NA	5.60E-02		na	NA	1.50E+03		na
di-n-butyiphthalate	AN	3.65E+02		na	NA	1.50E+04		na
butylbenzylphthalate	AN	7.30E+02		na	AN .	5.00E+05		na
bis(2-ethylhexyl)phthalate	2.01E-02	4.80E-01	4.18E-02	00	2.09E+02	1.00E+04	2.09E-02	no
di-n-octylphthalate	NA	7.30E+01		na	NA	1.50E+05		na

NA = Not applicable

Footnotes:

na = Not available because health-based screening value is not available or not applicable because compound was not detected.

NV = No value

Cehonic = Chronic time-averaged concentration

HBSL = Chronic health-based screening level

Sacute = Acute concentration

ATV = Acute toxicity value

Table D-28: Comparison of Air Concentrations With Health-Based Values: PAHs, Dioxins/Furans, Aldehydes, and Acid Gases

		156min	n propelling	Charge	155mm propelling charge M3 (zone 5), M199 cannon DODIC: D540	#199 cannon		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 12	Cacute (µg/m³)	Acute Toxicity Value (µg/m³)	Gacute/ ATV	× 13
PAHs								
acenaphthylene	1.54E-04	N		na	6.87E-01	2.00E+02	3.44E-03	no
acenaphthene	AA	2.19E+02		na	NA	1.25E+03		na
fluorene	8.23E-05	1.46E+02	5.64E-07	no	3.68E-01	7.50E+04	4.90E-06	ou
phenanthrene	2.38E-04	۸N		na	1.06E+00	2.00E+03	5.31E-04	ou
anthracene	3.11E-05	1.10E+03	2.84E-08	ou .	1.39E-01	6.00E+03	2.31E-05	01
fluoranthene	1.64E-04	1.46E+02	1.13E-06	no	7.34E-01	3.00E+01	2.45E-02	no
ругепе	5.01E-04	1.10E+02	4.57E-06	no	2.24E+00	1.50E+04	1.49E-04	ou
benzo(a)anthracene	1.23E-05	2.17E-02	5.68E-04	no	1.28E-01	6.00E+02	2.14E-04	no
chrysene	1.33E-05	2.17E+00	6.11E-06	no	1.38E-01	2.00E+02	6.91E-04	ou
benzo(b)fluoranthene	2.40E-05	2.17E-02	1.11E-03	no	6.24E-02	NA		na
benzo(k)fluoranthene	3.15E-05	2.17E-01	1.45E-04	no	8.20E-02	NA		na
benzo(a)pyrene	4.40E-05	2.17E-03	2.03E-02	no	4.58E-01	7.50E+03	6.11E-05	no
Indeno(1,2,3-cd)pyrene	7.05E-05	2.17E-02	3.25E-03	no On	1.84E-01	NA		na
dibenz(a,h)anthracene	2.23E-06	2.17E-03	1.03E-03	no	2.32E-02	3.00E+04	7.73E-07	no
benzo(g,h,i)perylene	3.95E-04	N		na	1.76E+00	3.00E+04	5.88E-05	no
Dioxins / Furans								
2378-Tetrachlorodibenzo-p-dloxin	2.03E-09	4.48E-08	4.52E-02	no	2.11E-05	3.50E+00	6.04E-06	no
12378-Pentachlorodibenzo-p-dioxin	6.59E-10	N/		na	2.94E-06	2.50E+00	1.18E-06	no
123478-Hexachlorodibenzo-p-dloxin	NA	N		na	NA	NA		na
123678-Hexachlorodibenzo-p-dioxin	1.91E-09	N N		na	8.55E-06	1.50E+01	5.70E-07	no
123789-Hexachlorodibenzo-p-dloxin	2.99E-10	1.48E-06	2.02E-04	uo	7.79E-07	NA		na
1234678-Heptachlorodlbenzo-p-dloxin	1.65E-08	N		na	1.84E-05	NA		na
Octachlorodibenzo-p-dloxin	9.60E-08	N		na	1.07E-04	NA		na
2378-Tetrachlorodibenzo-p-furan	2.08E-09	≷		na	9.29E-06	2,00E+00	4.64E-06	no
12378-Pentachlorodibenzo-p-furan	1.95E-09	Š		na	2.18E-06	NA.		na
23478-Pentachlorodibenzo-o-furan	9.11E-10	N		na	4.07E-06	7.50E-02	5.42E-05	no
123478-Hexachlorodibenzo-p-furan	1.54E-09	N		na	6.86E-06	7:50E+00	9.15E-07	no
123789-Hexachlorodibenzo-p-furan	NA	N		па	NA	NA		na
234678-Hexachlorodibenzo-p-furan	6.41E-10	≥N		na	2.86E-06	1.50E+00	1.91E-06	OU
1234678-Heptachlorodlbenzo-p-furan.	6.93E-09	N		na	7.73E-06	NA		па
1234789-Heptachlorodlbenzo-p-furan	, 3.24E-10	N		na	3.61E-07	NA		na
OCDF	4.36E-09	Ž		na	4.87E-06	NA		na
Aldehydes								
Formaldehyde	AN	1.48E-01		g	NA NA	1.23E+03		na

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Table D-28: Comparison of Air Concentrations With Health-Based Values: PAHs, Dioxins/Furans, Aldehydes, and Acid Gases 100 meter location

		155mm	n propelling	Charge DODIC	155mm propelling charge M3 (20he 5), M199 cannon DODIC: D540	V199 cannon		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	G _{chronic} / HBSL	> 12	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
Acetaldehyde	AN.	8.73E-01		na	AN	1.80E+04		па
Acetone	۸	3.65E+02		na	NA	2.37E+06		na
Acrolein	AN	2.09E-02		na	NA	2.30E+02		na
Proprionaldehyde	AN	N		na	NA	7.50E+04		na
Crotonaldehyde	AN	3.54E-03		na	NA	5.72E+03		na
Butyraldehyde	NA	N/		, na	NA	7.38E+04		na
Benzaldehyde	NA	3.65E+02		na	NA	1.50E+04		na
isovaleraldehyde	NA	NV		na	NA	NA		na
Valeraldehyde	NA	NV		na	۸A	NA		na
o,m,p-Tolualdehyde	NA	NV		na	AN	AN		na
Hexaldehyde	NA	NV		na	NA	NA		na
2,5-Dimethylbenzaldehyde	NA	NV		na	AN	AN		na
Acid Gases								
Hydrogen fluoride	NA	NV		na	NA	1.60E+03		na
Hydrogen chloride	NA	2.08E+01		na	NA	4.50E+03		na
Hydrogen bromide	NA	N		na	AA	9.93E+03		na
Nitric Acid	NA	N<		na	NA	5.16E+03		na
Phosphoric acid	NA	1.04E+01		na	AN	3.00E+03		na
Sulfuric Acid	NA	N		na	NA	2.00E+03		na

Footnote:

NA = Not applicable because compound was not detected.
na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value

Cennote = Chronic time-averaged concentration; HBSL = Chronic health-based screening level

Gecute = Acute concentration; ATV = Acute toxicity value

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Table D-29: Comparison of Air Concentrations With Health-Based Values: Cyanides and Energetics

100 meter location								
		155mn	n propelling	charge	155mm propelling charge M3 (zone 5), M199 cannon DODIC: D540	//199 cannon		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	С _{асиtе} (µg/m³)	Acute Toxicity Value (µg/m³)	Gacute/ ATV	> 12
Particulate Cyanide and Hydrogen Cyanide (CN)								
Particulate Cyanide	6.72E-02	7.30E+01	9.21E-04	no	3.00E+02	5.00E+03	6.00E-02	no
Hydrogen Cyanide	9.24E-01	3.13E+00	2.95E-01	no	4.13E+03	5.17E+03	7.98E-01	DO
Energetics								
Nitrobenzene	NA	2.09E+00	•	na	NA	1.51E+04		na
2-Nitrotoluene	NA	3.65E+01		na	NA	AN		na
3-Nitrotoluene	NA	3.65E+01		na	NA	NA		na
4-Nitrotoluene	AN	3.65E+01		na	NA	3.37E+04		na
Nitroglycerine	ΑΝ	4.80E-01		na	NA	NA		na
1,3-Dinitrobenzene	NA	3.65E-01		na	NA	3.00E+03		na
2,6-Dinitrotoluene	NA	3.65E+00		na	NA	6.00E+02		na
2,4-Dinitrotoluene	AN	7.30E+00		na	NA	6.00E+02		na
1,3,5-Trinitrobenzene	AN	1.10E+02		na	NA	3.00E+04		na
2,4,6-Trinitrotoluene	AN	2.24E-01		na	NA	2.50E+04		na
RDX	AN	6.11E-02		na	NA	NA		na
4-Amino-2,6-Dinitrotoluene	NA	N\			NA	NA		
2-Amino-4,6-Dinitrotoluene	NA	NV			NA	1.50E+04		
Tetryl	AN	3.65E+01		na	AA	NA		na
HMX	NA	1.83E+02		na	AN	AN		na
Pentaerythritoltetranitrate	NA	NV		na	A A	5.00E+01		na
Dibutyl phthalate	NA	3.65E+02		na	NA	1.50E+04		na
Dioctyl phthalate	NA	4.80E-01		na	NA	1.00E+04		na
Diphenylamine	NA	9.13E+01		na	NA	3.00E+04		na
Footnote:								-

NA = Not applicable because compound was not detected.

na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value

Cchronic = Chronic time-averaged concentration; HBSL = Chronic health-based screening level

Cacule = Acute concentration; ATV = Acute toxicity value

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M3risk1.xls

Table D-30: Comparison of Air Concentrations With Health-Based Values: Total Petroleum Hydrocarbons 100 meter location

	155Mm	155mm propelling charge M3 (zone 5), M199 cannon boilg: മ്840	:harge M3 (zone 5), M19) DGDIG: มีธ40	9 cannon
Compound (a)	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)
	Allphatic:C<=8	Allphatic: C>8	Aromatic:C<=8	Aromatic: C>8
Benzene	NA	NA	4.13E-02	NA
Toluene	NA	NA	1.15E-03	AN
naphthalene	NA	· NA	NA	1.16E-03
acenaphthylene	NA	NA	NA	1.54E-04
acenaphthene	NA	NA	NA	
fluorene	NA	NA	NA	8.23E-05
phenanthrene	NA	AN	NA	2.38E-04
anthracene	NA	NA	NA	3.11E-05
Total (µg/m³)	00+300°0	0.00E+00	4.25E-02	1.66E-03
Derived Health-Based Screening Level	1.92E+04	1.04E+03	4.17E+02	2.09E+02
C _{chronic} /HBSL	0.00E+00	0.00E+00	1.02E-04	7.98E-06
>12	ou	no	no	ou

Footnotes:

>1? = Is the ratio greater than one?

NA = Not Applicable because compound was not detected

C_{chronic} = chronic averaged air Concentration (not adjusted for cancer averaging time of 70 years)

HBSL = Health-Based Screening Level

RISK EVALUATION DATA FOR CHARGE M3, FIRED FROM THE M199 CANNON, ZONE 5, 200 METERS DOWNWIND

Table D-31: Comparison of Air Concentrations With Health-Based Values: Gases, Particulates and Metals

		155mr	n propelling	charge	155mm propelling charge M3 (zone 5), M199 cannon DODIC: D540	W199 cannon		
Compound	С _{сhronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 12	С _{асие} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	>15
Gases							•	
NH ₃	1.85E+00	1.04E+02	1.77E-02	ou	2.07E+03	1.75E+04	1.18E-01	ou
Carbon Dioxide (CO ₂)	2.38E+01	N N		na	1.06E+05	5.40E+07	1.97E-03	ou
Carbon Monoxide (CO)	6.26E+01	1.57E+02	3.99E-01	no	6.99E+04	2.30E+05	3.04E-01	OL
Nitrogen Oxides (as NO)	8.67E-01	1.00E+02	8.67E-03	no	3.87E+03	2.70E+05	1.43E-02	no
Methane (CH ₄)	AN	>N		na	NA	3.30E+06		na
Sulfur Dioxide (SO ₂)	AN	8.00E+01		na	AN	7.89E+02		na
Combined Particulate								
TSP	2.59E+00	5.00E+01	5.18E-02	no	2.89E+03	AN		na
PM ₁₀	1.85E+00	5.00E+01	3.70E-02	ou	2.06E+03	AN		na
PM _{2.5}	7,32E-01	1.50E+01	4.88E-02	ou	8.17E+02	AN		na
Metals								
Antlmony	6.43E-11	1.46E+00	4.41E-11	uo	2.87E-01	1.50E+03	1.92E-04	no
Arsenic	6.11E-05	4.47E-04	1.37E-01	ou	6.37E-01	3.00E+01	2.12E-02	no
Barlum	1.40E-03	5.21E-01	2.69E-03	ou	6.25E+00	1.50E+03	4.17E-03	no
Beryllium	NA	8.00E-04		na	NA	5.00E+00		na
Cadmium	2.09E-05	1.07E-03	1.96E-02	ou	2.18E-01	3.00E+01	7.26E-03	no
Chromlum	1.32E-04	1.53E-04	8.63E-01	ou	1.37E+00	1.50E+03	9.16E-04	no
Cobalt	3.88E-05	2.20E+02	1.77E-07	ou	1.73E-01	6.00E+01	2.89E-03	no
Copper	3.52E-01	1.46E+02	2.41E-03	no	1.57E+03	3.00E+03	5.23E-01	no
Lead	7.02E-03	1.50E+00	4.68E-03	ou	3.14E+01	1.50E+02	2.09E-01	no
Manganese	1.73E-03	5.11E-02	3.38E-02	ou	7.71E+00	3.00E+03	2.57E-03	no
Nickel	5.75E-10	7.30E+01	7.88E-12	OU	2.57E+00	3.00E+03	8.56E-04	no
Selenium	NA	1.83E+01		na	NA	6.00E+02		na
Silver	2.36E-11	1.83E+01	1.29E-12	ou	1.06E-01	3.00E+02	3.52E-04	no
Thallium	NA	2.56E-01		na	NA	3.00E+02		na
Zinc	5.53E-08	1.10E+03	5.05E-11	ou	2.47E+02	3.00E+04	8.23E-03	no
Footnote:								

na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value

C_{chronic} = Chronic time-averaged concentration; HBSL = Chronic health-based screening level C_{scute} = Acute concentration; ATV = Acute toxicity value

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Table D-32: Comparison of Air Concentrations With Health-Based Values: Volatile Organic Compounds

		18Rmm n	A MAIIIMA	Parameter A	KAZ (wang E)	#100 Admood		
				DODIC	DODIC: D\$40			
Compound (a)	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 12	С _{асиtе} (µg/m³)	Acute Toxicity Value (µg/m³)	C _{acute} / ATV	> 1?
VOCs								
Dichlorodifluoromethane	NA	2.09E+02		na	NA	1.48E+07		na
Methyl Chloride	NA	1.07E+00		na	NA	2.06E+05		na
Dichlorotetrafluoroethane	NA	N		na	NA	NA		na
Vinyi Chloride	NA	2.20E-02	•	na	NA	1.28E+04		na
1,3-Butadiene	NA	3.74E-03		na	NA	2.20E+04		na
Methyl Bromide	NA	5.21E+00		na	NA	5.82E+04		na
Ethyl Chloride	NA	2.32E+00		na	NA	7.92E+06		na
Trichlorofluoromethane	NA	7.30E+02		na	NA	2.81E+06		na
1,1-Dichloroethene	5.77E-04	5.21E+02	1.11E-06	no	6.44E-01	7.92E+04	8.14E-06	20
Dichloromethane	1.45E-02	4.09E+00	3.55E-03	no	3.78E+01	6.96E+05	5.44E-05	20
3-Chloropropene	NA	1.04E+00		na	NA	9.39E+03		na
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	3.13E+04		na	AA	9.58E+06		na
1,1-Dichloroethane	NA	5.21E+02		na	NA	1.21E+06		na
cls-1,2-Dichloroethene	NA	3.65E+01		na	NA	7.92E+05		na
Trichloromethane	NA	8.35E-02		na	NA	9.76E+03		na
1,2-Dichloroethane	NA	7.39E-02		na	NA	8.08E+03		na
1,1,1-Trichtoroethane	NA	1.04E+03		na	A'A	1.94E+06		na
Benzene	7.33E-03	2.49E-01	2.94E-02	ou	1.91E+01	1.56E+05	1.22E-04	no
Carbon Tetrachloride	NA	1.28E-01		na	Ā	1.28E+05		na
1,2-Dichloropropane	ΑN	9.89E-02		na	ΑΝ	5.08E+05		na
Trichloroethene	AN A	1.12E+00		na	¥.	5.38E+05		na
cis-1,3-Dichloropropene	AN	5.17E-02		na	A'N	1.14E+04		na
trans-1,3-Dichloropropene	NA	5.17E-02		na	NA NA	NA		na
1,1,2-Trichloroethane	NA	1.20E-01		na	ΝΑ	1.64E+05		na
Toluene	4.74E-04	4.02E+02	1.18E-06	no	5.29E-01	1.88E+05	2.82E-06	no
1,2-Dibromoethane	NA	8.73E-03		na	ΑΝ	1.54E+05		na
Tetrachloroethene	NA	3.31E+00		na	NA	6.78E+05		na
Chlorobenzene	NA	6.21E+01		na	Ä	1.38E+05		na
Ethylbenzene	AN AN	1.06E+03		na	AA	5.43E+05		na
m&p-Xylene	NA	7.30E+02		na	NA	6.51E+05		na

Table D-32: Comparison of Air Concentrations With Health-Based Values: Volatile Organic Compounds

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Zuu meter location								
		155mm pr	opelling c	harge M3 (zo DODIC: D540	155mm propelling charge M3 (zone 5), M199 cannon DODIC: D540	//199 cannon		
Commund (a)	(F.m/pii)	Health-Based Screening Level	Cchronic/	> 12	C. (lia/m³)	Acute Toxicity	Ct./ ATV	> 12
Componia (a)	Chronic (Pg)	(µg/m³)	HBSL		acute (FB/)	Value (µg/m³)	acute	
Styrene	AN	1.06E+03		na	NA	2.13E+05		na
1,1,2,2-Tetrachioroethane	AN	3.31E-02		na	NA	2.06E+04		na
o-Xylene	ΝΑ	7.30E+02		na	NA	6.51E+05		na
4-Ethyltoluene	NA VA	N		na	NA	1.25E+05		na
1,3,5-Trimethylbenzene	NA	6.21E+00	•	na	NA	3.68E+05		na
1,2,4-Trimethylbenzene	AN	6.21E+00		na	NA	1.80E+05		na
Benzyl Chloride	AN	3.96E-02		na	NA	5.20E+03		na
m-Dichlorobenzene	۸N	3.29E+00		na	NA	3.61E+04		na
p-Dichlorobenzene	NA	3.06E-01		na	NA	6.61E+05	,	na
o-Dichlorobenzene	NA	2.09E+02		na	NA	3.01E+05		na
1,2,4-Trichlorobenzene	NA	2.08E+02		na	NA	3.71E+04		na
Hexachlorobutadlene	NA	8.62E-02		na	NA	3.21E+04		па
Hydrocarbons								
Methane	4,01E-01	NV		na	1.79E+03	3.30E+06	5.43E-04	no
Ethane	NA	N N		na	NA A	Z A		na
Ethylene	NA	N		na	ΑĀ	4.60E+05		na
Propane	NA	NV		na	NA	3.78E+06		na
Acetylene	NA	NV		na	ΝΑ	NA		na
Isobutane	NA	N		na	NA	9.52E+05		na
n-Butane	NA	N		na	Ϋ́	5.71E+06		na
Propylene	NA	N		na	ΔA	NA		na

Footnotes:

NA = Not applicable necause health-based screening value is not available or not applicable because compound was not detected.

NV = No value

C_{chronte} = Chronic time-averaged concentration

HBSL = Chronic health-based screening level

Cacute = Acute concentration

Table D-33: Comparison of Air Concentrations With Health-Based Values: Semi-Volatile Organic Compounds

		155mm p	ropalling	charge	155mm propelling charge M3 (zone 5), M199 cannon	M199 cannon		
				DODIC	DODIC: D540	A		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	Cacute (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
SVOCs								
n-nitrosodimethylamine	NA	1.37E-04		na	AN	2.50E+03		na
bis(2-chloroethyl)ether	۸N	5.82E-03		na	AN	5.85E+04		na
phenol	7.26E-04	2.19E+03	3.32E-07	2	3.24E+00	3.85E+04	8.43E-05	no
2-chlorophenol	۷V	1.83E+01		na	AN	5.25E+03		na
1,3-dichlorobenzene	۷N	3.29E+00		na	NA	3.61E+04		na
1,4-dichlorobenzene	۷V	3.06E-01		na	AN	6.61E+05		na
1,2-dichlorobenzene	۷N	2.09E+02		na	NA	3.01E+05		na
benzyl alcohol	۷N	1.10E+03		na	AN	5.53E+04		na
bis(2-chloroisopropyl)ether	AN	1.92E-01		na	AN	6.99E+04		na
2-methylphenol	ΑN	1.83E+02		na	ĀN	NA		na
hexachloroethane	NA	4.80E-01		na	NA	2.90E+04		na
n-nitroso-di-n-propylamine	NA	9.61E-04		na	NA	2.00E+02		na
4-methylphenol	NA	1.83E+02		na	NA	AN		na
nitrobenzene	NA	2.09E+00		na	NA	1.51E+04		na
isophorone	NA	7.08E+00		na	NA	2.83E+04		na
2-nitrophenol	NA	N		na	NA	NA		na
2,4-dimethylphenol	NA	7.30E+01		na	NA	AN		na
bis(2-chloroethoxy)methane	NA	NV		na	NA	AN		na
2,4-dichlorophenol	۸A	1.10E+01		na	NA	3.00E+04		na
1,2,4-trichlorobenzene	NA	2.08E+02		na	NA	3.71E+04		na
naphthalene	4.80E-04	3.13E+00	1.53E-04	20	2.14E+00	7.86E+04	2.73E-05	no
4-chloroaniline	NA	1.46E+01		па	NA	3.00E+04		na
hexachlorobutadiene	NA	8.62E-02		na	ΑĀ	3.21E+04		na
4-chloro-3-methylphenol	ΑN	N		na	NA	2.00E+04		na
2-methylnaphthalene	NA	7.30E+01		na	NA	2.00E+04		na
hexachlorocyclopentadiene	AN	7.30E-02		na	NA	2.23E+02		na
2,4,6-trichlorophenol	۸A	1.10E+02		na	NA	AN		na
2,4,5-trichlorophenol	NA	3.65E+02		na	NA	3.00E+04		na
2-chloronaphthalene	NA	2.92E+02		na	NA	6.00E+02		na
2-nitroaniline	ΑΝ	2.09E-01		na	NA	NA		na
dimethylphthalate	NA	3.65E+04		na	NA	1.50E+04		na
2,6-dinitrotoluene	AA	3.65E+00		na	ΑΝ	6.00E+02		na

Table D-33: Comparison of Air Concentrations With Health-Based Values: Semi-Volatile Organic Compounds

Compound Control (µg/m³) Some state of the properties of the prope	Health-Based (13) Screening Level (µg/m³) NV 7.30E+00 7.30E+01 7.30E+01 7.30E+01	Gehronic/	7	Cacute (µg/m³) NA NA NA NA	Acute Toxicity Value (µg/m³) 9.00E+03	Gacute/ ATV	
	7.30E+00 1.46E+01 7.30E+00 2.92E+01		2 B B B C	AN N N	9.00E+03		> 12
	7.30E+00 1.46E+01 7.30E+00 2.92E+01		an an an	AN A			na
	1.46E+01 7.30E+00 2.92E+01		na na	AN A	7.50E+03		na
	7.30E+00 2.92E+01		na	VIV	NA		na
	2.92E+01		2	NA.	6.00E+02		na
	AN		- 10	NA	3.00E+04		na
	^		na	NA	NA		na
	2.92E+03		na	NA	1.50E+04		na
	>N		na	NA	9.00E+03		na
	3.65E-01		na	NA	5.00E+02		na
	1.37E+00		na	NA	NA		na
	N/		na	NA	NA		na
hexachlorobenzene	4.18E-03		na	NA	7.50E+01		na
	5.60E-02		na	NA	1.50E+03		na
dl-n-butyiphthalate NA	3.65E+02		na	NA	1.50E+04		na
	7.30E+02		na	NA	5.00E+05		na
bis(2-ethylhexyl)phthalate 8.31E-03	4.80E-01	1.73E-02	no	8.66E+01	1.00E+04	8.66E-03	no
di-n-octylphthalate NA	7.30E+01		na	AA	1.50E+05		na

Footnotes:

NA = Not applicable

na = Not available because health-based screening value is not available or not applicable because compound was not detected.

NV = No value

Cehronic = Chronic time-averaged concentration

HBSL = Chronic health-based screening level

C_{acute} = Acute concentration

Table D-34: Comparison of Air Concentrations With Health-Based Values: PAHs, Dioxins/Furans, Aldehydes, and Acid Gases

		155mr	n propelling	charge	155mm propelling charge M3 (zone 5), M199 cannon DODIC: D540	M199 cannon		
Compound	C _{chronte} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronle} /	> 12	C _{acute} (µg/m³)	Acute Toxicity Value (μg/m³)	Cacute/ ATV	> 12
PAHS								
acenaphthylene	6.37E-05	N		na	2.84E-01	2.00E+02	1.42E-03	01
acenaphthene	AN	2.19E+02		na	AN	1.25E+03		na
fluorene	3,41E-05	1.46E+02	2.33E-07	2	1.52E-01	7.50E+04	2.03E-06	OU
phenanthrene	9.85E-05	NN		na	4.40E-01	2.00E+03	2.20E-04	ou
anthracene	1.29E-05	1.10E+03	1.18E-08	ou '	5.75E-02	6.00E+03	9.58E-06	ou
fluoranthene	6.80E-05	1.46E+02	4.66E-07	no	3.04E-01	3.00E+01	1.01E-02	ou
ругепе	2.07E-04	1.10E+02	1.89E-06	no	9.26E-01	1.50E+04	6.17E-05	Ou
benzo(a)anthracene	5.10E-06	2.17E-02	2.35E-04	no	5.32E-02	6.00E+02	8.86E-05	OL OL
chrysene	5.49E-06	2.17E+00	2.53E-06	no	5.72E-02	2.00E+02	2.86E-04	on On
benzo(b)fluoranthene	9.92E-06	2.17E-02	4.57E-04	no	2.58E-02	NA		na
benzo(k)fluoranthene	1.30E-05	2.17E-01	6.00E-05	uou	3.39E-02	NA		na
benzo(a)pyrene	1.82E-05	2.17E-03	8.39E-03	no	1.90E-01	7.50E+03	2.53E-05	on On
Indeno(1,2,3-cd)pyrene	2.92E-05	2.17E-02	1.35E-03	no	7.61E-02	NA		na
dibenz(a,h)anthracene	9.21E-07	2.17E-03	4.25E-04	92	9.60E-03	3.00E+04	3.20E-07	ou
benzo(g,h,i)perylene	1.64E-04	NN		na	7.30E-01	3.00E+04	2.43E-05	ou
Dioxins / Furans								
2378-Tetrachlorodibenzo-p-dioxin	8.40E-10	4.48E-08	1.87E-02	no	8.75E-06	3.50E+00	2.50E-06	no
12378-Pentachlorodibenzo-p-dioxin	2.73E-10	N<		na	1.22E-06	2.50E+00	4.87E-07	no On
123478-Hexachlorodibenzo-p-dioxin	NA	NV		na	AN	NA		na
123678-Hexachlorodibenzo-p-dioxin	7.92E-10	>N		na	3.54E-06	1.50E+01	2.36E-07	OU
123789-Hexachlorodibenzo-p-dloxin	1.24E-10	1.48E-06	8.37E-05	OU	3.22E-07	NA		na
1234678-Heptachlorodibenzo-p-dloxin	6.83E-09	Ž		na	7.63E-06	NA		na
Octachlorodibenzo-p-dloxin	3.97E-08	≥		na	4.44E-05	NA		na
2378-Tetrachlorodibenzo-p-furan	8.61E-10	Ž		na	3.85E-06	2.00E+00	1.92E-06	no
12378-Pentachlorodibenzo-p-furan	8,09E-10	≥		na	9.03E-07	NA		na
23478-Pentachlorodibenzo-o-furan	3.77E-10	⋛		na	1.68E-06	7.50E-02	2.24E-05	no
123478-Hexachlorodibenzo-p-furan	6.36E-10	≥		na	2.84E-06	7.50E+00	3.79E-07	OU
123789-Hexachlorodlbenzo-p-furan	NA	N<		na	ΑN	NA		na
234678-Hexachlorodibenzo-p-furan	2.66E-10	≥		na	1.19E-06	1.50E+00	7.90E-07	no
1234678-Heptachlorodibenzo-p-furan	2.87E-09	≥		na	3.20E-06	NA		na
1234789-Heptachlorodibenzo-p-furan	1.34E-10	N N		na	1.50E-07	NA		na
OCDF	1.81E-09	Ş		na	2.02E-06	NA		na
Aldehydes								
Formaldehyde	NA	1.48E-01		na	NA	1.23E+03		na
								The same of the sa

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Table D-34: Comparison of Air Concentrations With Health-Based Values: PAHs, Dioxins/Furans, Aldehydes, and Acid Gases

		155mn	n propelling	charge DODIC	155mm propelling charge M3 (zone 5), M199 cannon DODIC: D540	M199 cannon		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 12	С _{асиге} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
Acetaldehyde	AN	8.73E-01		na	ΑN	1.80E+04		na
Acetone	ĄN	3.65E+02		na	NA	2.37E+06		na
Acrolein	NA	2.09E-02		na	NA	2,30E+02		na
Proprionaldehyde	NA	NN		na	NA	7.50E+04		na
Crotonaldehyde	NA	3.54E-03		na	NA	5.72E+03		na
Butyraldehyde	NA	NN		, na	NA	7.38E+04		na
Benzaldehyde	NA	3.65E+02		na	NA	1.50E+04		na
Isovaleraldehyde	NA	NV		na	NA	NA		na
Valeraldehyde	NA	NV		na	NA	NA		na
o,m,p-Tolualdehyde	NA	NV		na	AN	AN		na
Hexaldehyde	NA	N/		na	NA	AN		na
2,5-Dimethylbenzaldehyde	NA	۸N		na	AN	AN		na
Acid Gases								
Hydrogen fluoride	NA	۸N		na	NA	1.60E+03		na
Hydrogen chloride	NA	2.08E+01		na	NA	4.50E+03		na
Hydrogen bromide	NA	NV		na	NA	6.93E+03		na
Nitric Acid	NA	NV		na	NA	5.16E+03		na
Phosphoric acid	NA	1.04E+01		na	NA	3.00E+03		па
Sulfuric Acid	NA	N/		na	ΑN	2.00E+03		na
Cootpoto.								

Footnote:

NA = Not applicable because compound was not detected.

na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value

Cerronic = Chronic time-averaged concentration; HBSL = Chronic health-based screening level

Cacute = Acute concentration; ATV = Acute toxicity value

Table D-35: Comparison of Air Concentrations With Health-Based Values: Cyanides and Energetics 200 meter location

ZUU Meter location								
		155mn	n propelling	charge DODIC	155mm propelling charge M3 (zone 5), M199 cannon DODIC: D540	#199 cannon		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacule/ ATV	> 1?
Particulate Cyanide and Hydrogen Cyanide (CN)								
Particulate Cyanide	2.78E-02	7.30E+01	3.81E-04	no	1.24E+02	5.00E+03	2.49E-02	no
Hydrogen Cyanide	3.83E-01	3.13E+00	1.22E-01	no	1.71E+03	5.17E+03	3.30E-01	no
Energetics								
Nitrobenzene	AN	2.09E+00	•	na	NA	1.51E+04		na
2-Nitrotoluene	NA	3.65E+01		na	NA	NA		na
3-Nitrotoluene	NA	3.65E+01		na	NA	NA		na
4-Nitrotoluene	ΝΑ	3.65E+01		na	NA	3.37E+04		na
Nitroglycerine	NA	4.80E-01		na	NA	NA		na
1,3-Dinitrobenzene	NA	3.65E-01		na	NA	3.00E+03		na
2,6-Dinitrotoluene	NA	3.65E+00		na	NA	6.00E+02		na
2,4-Dinitrotoluene	NA	7.30E+00		na	NA	6.00E+02		na
1,3,5-Trinitrobenzene	NA	1.10E+02		na	NA	3.00E+04		na
2,4,6-Trinitrotoluene	NA	2.24E-01		na	NA	2.50E+04		na
RDX	NA	6.11E-02		na	NA	NA		na
4-Amino-2,6-Dinitrotoluene	NA	NV			NA	NA		
2-Amino-4,6-Dinitrotoluene	NA	NV			NA	1.50E+04		
Tetryl	NA	3.65E+01		na	NA	NA		na
HMX	NA	1.83E+02		na	NA	NA		na
Pentaerythritoltetranitrate	NA	NV		na	NA	5.00E+01		na
Dibutyl phthalate	NA	3.65E+02		na	NA	1.50E+04		na
Dioctyl phthalate	NA	4.80E-01		na	NA	1.00E+04		na
Diphenylamine	NA	9.13E+01		na	NA	3.00E+04		na
Footnote:								

ootnote:

NA = Not applicable because compound was not detected.

na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value

 $C_{\rm chronic}$ = Chronic time-averaged concentration; HBSL = Chronic health-based screening level $C_{\rm acute}$ = Acute concentration; ATV = Acute (oxicity value)

Table D-36: Comparison of Air Concentrations With Health-Based Values: Total Petroleum Hydrocarbons 200 meter location

	155mm ₁	oropelling charge DODIC	155mm propelling charge M3 (zone 5), M199 cannon DODIC: D540	9 cannon
Compound (a)	С _{сигоніс} (µg/m³)	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)
	Aliphatic:C<=8	Allphatic:C>8	Aromatic: C<=8	Aromatic:C>8
Benzene	NA	NA	1.71E-02	NA
Toluene	AN	NA	4.74E-04	NA
naphthalene	AN	AN ·	NA	4.80E-04
acenaphthylene	۸N	VN	AN	6.37E-05
асепарhthепе	AN	AN	AN	
fluorene	NA	NA	NA	3,41E-05
phenanthrene	NA	AN	NA	9.85E-05
anthracene	NA	NA	NA	1.29E-05
Total (µg/m³)	0.00E+00	0.00E+00	1.76E-02	6.89E-04
Derived Health-Based Screening Level	1.92E+04	1.04E+03	4.17E+02	2.09E+02
C _{chrontc} /HBSL	0.00E+00	0.00E+00	4.21E-05	3.30E-06
>1?	no	no	no	no

Footnotes:

>1? = Is the ratio greater than one?

NA = Not Applicable because compound was not detected

C_{chronic} = chronic averaged air Concentration (not adjusted for cancer averaging time of 70 years)

HBSL = Health-Based Screening Level

RISK EVALUATION DATA FOR CHARGE M3A1, FIRED FROM THE M199 CANNON, ZONE 3, 100 METERS DOWNWIND

Table D-37: Comparison of Air Concentrations With Health-Based Values: Gases, Particulates and Metals 100 meter location

		155mm	propelling	charge I	arge M3A1 (zone 3),	155mm propelling charge M3A1 (zone 3), M199 cannon ที่เอกเฉาะ กรุงก		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chrontc} / HBSL	> 12	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	>12
Gases								
NH ₃	1.29E+00	1.04E+02	1.24E-02	no	1.44E+03	1.75E+04	8.24E-02	no
Carbon Dioxide (CO ₂)	2.22E+01	N .		na	9.89E+04	5.40E+07	1.83E-03	2
Carbon Monoxide (CO)	5.90E+01	1.57E+02	3.76E-01	no	6.58E+04	2.30E+05	2.86E-01	01
Nitrogen Oxldes (as NO)	NA	1.00E+02		na	NA	2.70E+05		na
Methane (CH₄)	NA	NV		na	NA	3.30E+06		na
Sulfur Dioxide (SO ₂)	AN	8.00E+01		na	AN	7.89E+02		na
Combined Particulate								
TSP	1.89E+00	5.00E+01	3.78E-02	on On	2.11E+03	AN		na
PM ₁₀	1.34E+00	5.00E+01	2.68E-02	υO	1.50E+03	NA		na
PM _{2.5}	7.26E-01	1.50E+01	4.84E-02	OU	8.11E+02	NA		na
Metals								
Antimony	NA	1.46E+00		na	NA NA	1.50E+03		na
Arsenic	1.83E-05	4.47E-04	4.10E-02	no	1.91E-01	3.00E+01	6.36E-03	no
Barlum	9.14E-04	5.21E-01	1.75E-03	no	4.08E+00	1.50E+03	2.72E-03	no
Beryllium	NA	8.00E-04		na	NA	5.00E+00		na
Cadmlum	1.37E-05	1.07E-03	1.29E-02	no	1.43E-01	3.00E+01	4.77E-03	no
Chromlum	1.09E-04	1.53E-04	7.16E-01	no	1.14E+00	1.50E+03	7.59E-04	no
Cobalt	2.24E-05	2.20E+02	1.02E-07	no	9.99E-02	6.00E+01	1.66E-03	no
Copper	2.49E-01	1.46E+02	1.71E-03	no	1.11E+03	3.00E+03	3.71E-01	no
Lead	7.34E-03	1.50E+00	4.89E-03	no	3.28E+01	1.50E+02	2.19E-01	no
Manganese	8.14E-04	5.11E-02	1.59E-02	no	3.63E+00	3.00E+03	1.21E-03	ou
Nickel	4.45E-10	7.30E+01	6.10E-12	no	1.99E+00	3.00E+03	6.63E-04	on O
Selenium	N.	1.83E+01		na	NA	6.00E+02		na
Silver	2.00E-11	1.83E+01	1.10E-12	no	8.94E-02	3.00E+02	2.98E-04	no
Thallium	AN A	2.56E-01		na	AN	3.00E+02		na
Zinc	5.35E-08	1.10E+03	4.88E-11	no	2.39E+02	3.00E+04	7.96E-03	no
Footnote:								

Footnote:

NA = Not applicable because compound was not detected.

na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value

 C_{chronic} = Chronic time-averaged concentration; HBSL = Chronic health-based screening level C_{scute} = Acute concentration; ATV = Acute toxicity value

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Table D-38: Comparison of Air Concentrations With Health-Based Values: Volatile Organic Compounds

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		155mm pro	pelling of	narge N	13A1 (zone 3),	155mm propelling charge M3A1 (zone 3), M199 cannon		
				DODIC	DODIC: D540			
Compound (a)	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chrontc} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	C _{acute} / ATV	> 1?
VOCs								
Dichlorodifluoromethane	NA	2.09E+02		na	NA	1.48E+07		na
Methyl Chloride	NA	1.07E+00		na	NA	2.06E+05		na
Dichlorotetrafluoroethane	NA	N		na	NA	AN		na
Vinyl Chloride	NA	2.20E-02	•	na	NA	1.28E+04		na
1,3-Butadiene	NA	3.74E-03		ua	NA	2.20E+04		na
Methyl Bromide	NA	5.21E+00		na	NA	5.82E+04		na
Ethyl Chloride	NA	2.32E+00		na	NA	7.92E+06		na
Trichlorofluoromethane	NA	7.30E+02		ua	NA	2.81E+06		na
1,1-Dichloroethene	8.86E-04	5.21E+02	1.70E-06	ou	9.90E-01	7.92E+04	1.25E-05	92
Dichloromethane	3.22E-02	4.09E+00	7.88E-03	ou	8.39E+01	6.96E+05	1.21E-04	no
3-Chloropropene	NA	1.04E+00		na	NA	9.39E+03		na
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	3.13E+04		na	NA	9.58E+06		na
1,1-Dichloroethane	NA	5.21E+02		ua	NA	1.21E+06		na
cls-1,2-Dichloroethene	NA	3.65E+01		na	NA	7.92E+05		na
Trichloromethane	A A	8.35E-02		na	NA	9.76E+03		na
1,2-Dichtoroethane	NA A	7.39E-02		na	NA	8.08E+03		na
1,1,1-Trichioroethane	NA	1.04E+03		na	NA	1.94E+06		na
Вепzепе	9.30E-03	2.49E-01	3.73E-02	ou	2.42E+01	1.56E+05	1.55E-04	no
Carbon Tetrachloride	ΔN	1.28E-01		na	NA	1.28E+05		na
1,2-Dichloropropane	NA	9.89E-02		na	NA	5.08E+05		na
Trichloroethene	NA A	1.12E+00		na	NA	5.38E+05		na
cis-1,3-Dichloropropene	NA	5.17E-02		na	NA	1.14E+04		na
trans-1,3-Dichloropropene	NA	5.17E-02		na	NA	NA		na
1,1,2-Trichloroethane	A A	1.20E-01		na	NA	1.64E+05		na
Toluene	1.06E-03	4.02E+02	2.64E-06	no	1.18E+00	1.88E+05	6.31E-06	20
1,2-Dibromoethane	A'N	8.73E-03		na	NA	1.54E+05		na
Tetrachloroethene	NA	3.31E+00		na	NA	6.78E+05		na
Chlorobenzene	NA NA	6.21E+01		na	NA	1.38E+05		na
Ethylbenzene	NA V	1.06E+03		na	A A	5.43E+05		na
m&p-Xylene	NA NA	7.30E+02		na	NA	6.51E+05		na

Table D-38: Comparison of Air Concentrations With Health-Based Values: Volatile Organic Compounds

		155mm pro	pelling ch	arge M3A1 (z DODIC: D540	3A1 (zone 3), : D540	155mm propelling charge M3A1 (zone 3), M199 cannon DODIC: D540	*	
Compound (a)	С _{сьгопіс} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronle} / HBSL	> 1?	Cacute (µg/m³)	Acute Toxicity Value (µg/m³)	C _{acute} / ATV	> 1?
Styrene	ΝA	1.06E+03		na	NA	2.13E+05		na
1,1,2,2-Tetrachloroethane	AN	3.31E-02		na	NA	2.06E+04		na
o-Xylene	AN	7.30E+02		na	NA	6.51E+05		na
4-Ethyltoluene	AN	NV		na	NA	1.25E+05		na
1,3,5-Trimethylbenzene	NA	6.21E+00		na	NA	3.68E+05		na
1,2,4-Trlmethylbenzene	AN	6.21E+00		na	NA	1.80E+05		na
Benzyl Chloride	AN	3.96E-02		na	AA	5.20E+03		na
m-Dichlorobenzene	AN	3.29E+00		na	ΝΑ	3.61E+04		na
p-Dichlorobenzene	AN	3.06E-01		na	NA	6.61E+05		na
o-Dichlorobenzene	NA	2.09E+02		na	NA	3.01E+05		na
1,2,4-Trichlorobenzene	NA	2.08E+02		na	NA	3.71E+04		na
Hexachlorobutadiene	AN	8.62E-02		na	NA	3.21E+04		na
Hydrocarbons								
Methane	3.15E-01	NV		na	1.41E+03	3.30E+06	4.27E-04	OU
Ethane	NA	NV		na	NA	Ϋ́		na
Ethylene	NA	NV		na	NA	4.60E+05		na
Propane	AN	NV		na	NA	3.78E+06		na
Acetylene	AN	NV		na	NA	NA		na
Isobutane	AA	NV		na	NA	9.52E+05		na
n-Butane	NA	N		na	NA	5.71E+06		na
Propylene	NA	N		na	NA	NA		na

Footnotes:

NA = Not applicable

na = Not available because health-based screening value is not available or not applicable because compound was not detected.

NV = No value

C_{chronic} = Chronic time-averaged concentration

HBSL = Chronic health-based screening level

Cacute = Acute concentration

Table D-39: Comparison of Air Concentrations With Health-Based Values: Semi-Volatile Organic Compounds

		155mm pr	opelling ch	iarge M3A1 (z DODIC: D540	3A1 (zone 3),	155mm propelling charge M3A1 (zone 3), M199 cannon DODIC: D540		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 12	С _{асите} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
SVOCS								
n-nitrosodimethylamine	NA	1.37E-04		na	NA	2.50E+03		na
bis(2-chloroethyl)ether	AN	5.82E-03		na	NA	5.85E+04		na
loueld	5.10E-03	2.19E+03	2.33E-06	no	2.28E+01	3.85E+04	5,92E-04	no
2-chlorophenol	AN	1.83E+01		na	NA	5.25E+03		na
1,3-dichlorobenzene	NA	3.29E+00		na	NA	3.61E+04		na
1,4-dichlorobenzene	NA	3.06E-01		na	NA	6.61E+05		na
1,2-dichlorobenzene	ΑN	2.09E+02		na	NA	3.01E+05		na
benzyl alcohol	NA	1.10E+03		na	NA	5.53E+04		na
bis(2-chlorolsopropyl)ether	NA	1.92E-01		na	NA	6.99E+04		na
2-methylphenol	ΑN	1.83E+02		na	AN	NA		na
hexachloroethane	AN	4.80E-01		na	AN	2.90E+04		na
n-nitroso-di-n-propylamine	NA	9.61E-04		na	ΑĀ	2.00E+02		na
4-methylphenol	NA	1.83E+02		na	AN	NA		na
nitrobenzene	NA	2.09E+00		na	NA	1.51E+04		na
Isophorone	NA	7.08E+00		na	NA	2.83E+04		na
2-nitrophenol	NA	NV		na	NA VA	NA		na
2,4-dimethylphenol	NA	7.30E+01		na	ΝΑ	Ϋ́		na
bis(2-chloroethoxy)methane	NA	NV		na	NA	AN		na
2,4-dichlorophenol	NA	1.10E+01		na	NA	3.00E+04		na
1,2,4-trichlorobenzene	NA	2.08E+02		na	NA	3.71E+04		na
naphthalene	1.09E-03	3.13E+00	3.50E-04	20	4.88E+00	7.86E+04	6.21E-05	no
4-chloroaniline	NA	1.46E+01		na	A A	3.00E+04		na
hexachlorobutadiene	NA	8.62E-02		na	AA	3.21E+04		na
4-chloro-3-methy/phenoi	NA	NV		na	NA A	2.00E+04		na
2-methylnaphthalene	NA	7.30E+01		na	AA	2.00E+04		na
hexachlorocyclopentadlene	NA	7.30E-02		na	NA	2.23E+02		na
2,4,6-trichtorophenol	AA	1.10E+02		na	NA	NA		na
2,4,5-trichlorophenol	NA	3.65E+02		na	NA	3.00E+04		na
2-chloronaphthalene	NA	2.92E+02		na	NA	6.00E+02		na
2-nltroaniline	NA	2.09E-01		na	NA	NA		na
dimethylphthalate	A A	3.65E+04		na	NA	1.50E+04		na
2,6-dinitrotoluene	NA	3.65E+00		na	AA	6.00E+02		na

Table D-39: Comparison of Air Concentrations With Health-Based Values: Semi-Volatile Organic Compounds 100 meter location

		155mm pr	opelling cl	rarge N DODIC	large M3A1 (zone 3), DODIC: D540	155mm propelling charge M3A1 (zone 3), M199 cannon DODIC: D540		-
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronlc} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 1?
3-nitroaniline	AN A	>N		na	NA	9.00E+03		na
2,4-dinitrophenol	NA	7.30E+00		na	NA	7.50E+03		na
dibenzofuran	AN	1.46E+01		na	NA	ΑΝ		na
2,4-dinitrotoluene	AN	7.30E+00		na	NA	6.00E+02		na
4-nitrophenol	AN	2.92E+01		na	NA	3.00E+04		na
4-chlorophenyl-phenylether	۷V	N/		na	NA	ΑN		na
 diethylphthalate 	NA	2.92E+03		na	NA	1.50E+04		na
4-nitroaniline	ΑN	NN		na	NA	9.00E+03		na
4,6-dinitro-2-methylphenol	AN	3.65E-01		na	NA	5.00E+02		na
n-nitrosodiphenylamine(1)	NA	1.37E+00		na	NA	NA		na
4-bromophenyl-phenylether	۷A	NV		na	NA	NA		na
hexachlorobenzene	AN	4.18E-03		na	AN	7.50E+01		na
pentachlorophenol	NA	5.60E-02		na	NA	1.50E+03		na
di-n-butyiphthalate	۷N	3.65E+02		na	NA	1.50E+04		na
butylbenzylphthalate	۷N	7.30E+02		na	NA	5.00E+05		na
bis(2-ethylhexyl)phthalate	۷V	4.80E-01		na	NA	1.00E+04		na
di-n-octylphthalate	ΑN	7.30E+01		na	NA	1.50E+05		na
1 1 1								

Footnotes:

NA = Not applicable

na = Not available because health-based screening value is not available or not applicable because compound was not detected. NV = No value

Cchronic = Chronic time-averaged concentration

HBSL = Chronic health-based screening level

Cacule = Acute concentration

Table D-40: Comparison of Air Concentrations With Health-Based Values: PAHs, Dioxins/Furans, Aidehydes, and Acid Gases

		155mm	propelling	Harge I DODIC	large M3A1 (zone 3), DODIC: D540	155mm propelling charge M3A1 (zone 3), M199 cannon DODIC: D540		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	G _{chronic} / HBSL	> 13	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 13
PAHS								
acenaphthylene	1.80E-04	N/		na	8.04E-01	2.00E+02	4.02E-03	02
aćenaphthene	2.03E-05	2.19E+02	9.27E-08	no	9.07E-02	1.25E+03	7.25E-05	no
fluorene	7.06E-05	1.46E+02	4.84E-07	no	3.15E-01	7.50E+04	4.20E-06	no
phenanthrene	1.21E-04	NV		na	5.40E-01	2.00E+03	2.70E-04	ou
anthracene	1.49E-05	1.10E+03	1.36E-08	ou '	6.65E-02	6.00E+03	1.11E-05	no
fluoranthene	6.69E-05	1.46E+02	4.58E-07	no	2.99E-01	3.00E+01	9.96E-03	no
pyrene	1.61E-04	1.10E+02	1.47E-06	no	7.18E-01	1.50E+04	4.79E-05	no
benzo(a)anthracene	3.87E-06	2.17E-02	1.79E-04	no	4.04E-02	6.00E+02	6.73E-05	UO
chrysene	4.73E-06	2.17E+00	2.18E-06	no	4.92E-02	2.00E+02	2.46E-04	no
benzo(b)fluoranthene	1.38E-05	2.17E-02	6.35E-04	no	3.59E-02	NA		na
benzo(k)fluoranthene	8.90E-06	2.17E-01	4.10E-05	no	2.32E-02	NA		na
benzo(a)pyrene	1.76E-05	2.17E-03	8.11E-03	no	1.83E-01	7.50E+03	2.45E-05	no
indeno(1,2,3-cd)pyrene	3.14E-05	2.17E-02	1.45E-03	no	8.19E-02	NA		na
dibenz(a,h)anthracene	9.85E-07	2.17E-03	4.54E-04	no	1.03E-02	3.00E+04	3.42E-07	OL
benzo(g,h,i)perylene	1.43E-04	NV		na	6.41E-01	3.00E+04	2.14E-05	no
Dioxins / Furans								
2378-Tefrachlorodibenzo-p-dloxin	NA	4.48E-08		na	NA	3.50E+00		na
12378-Pentachlorodibenzo-p-dloxin	1.23E-10	N		na	5.50E-07	2.50E+00	2.20E-07	no
123478-Hexachlorodibenzo-p-dloxin	NA	NV		na	NA	NA		na
123678-Hexachlorodibenzo-p-dioxin	3.50E-10	N		na	1.56E-06	1.50E+01	1.04E-07	no
123789-Hexachlorodibenzo-p-dloxin	1.69E-10	1.48E-06	1.14E-04	01	4.39E-07	NA		na
1234678-Heptachlorodibenzo-p-dioxin	3.50E-09	N		na	3.90E-06	NA		na
Octachlorodibenzo-p-dloxin	1.37E-08	N		па	1.53E-05	NA		na
2378-Tetrachlorodibenzo-p-furan	NA	N		na	NA	2.00E+00		na
12378-Pentachlorodibenzo-p-furan	NA	≥		na	NA	NA		na
23478-Pentachlorodibenzo-o-furan	NA	N		na	NA	7.50E-02		na
123478-Hexachlorodibenzo-p-furan	6.25E-11	NV		na	2.79E-07	7.50E+00	3.72E-08	no
123789-Hexachlorodibenzo-p-furan	NA	N N		na	NA	, NA		na
234678-Hexachlorodibenzo-p-furan	NA	≥		na	NA	1.50E+00		na
1234678-Heptachlorodibenzo-p-furan	2.30E-10	N		na	2.57E-07	, NA		na
1234789-Heptachlorodibenzo-p-furan	NA NA	N		na	NA	NA		na
OCDF	4.55E-10	NΛ		na	5.08E-07	NA		na
Aldehydes								
Formaldehyde	NA	1.48E-01		na	NA	1.23E+03		na

1/16/01

Table D-40: Comparison of Air Concentrations With Health-Based Values: PAHs, Dioxins/Furans, Aldehydes, and Acid Gases

100 meter location		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		e service and a	19 A.4 (man 9)	00711		
		шшеет	propeiling	DODIC	narge M3A1 (zone 3), DODIC: D540	าออกเกา propelling cnarge พรคา (zone ร), พาชร cannon DODIC: D540		
Compound	С _{сhronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 12	С _{асиtе} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
Acetaldehyde	AA	8.73E-01		na	AN	1.80E+04		na
Acetone	ΝΑ	3.65E+02		na	NA	2.37E+06		na
Acrolein	NA	2.09E-02		na	NA	2.30E+02		na
Proprionaldehyde	NA	N		na	AN	7.50E+04		na
Crotonaldehyde	NA	3.54E-03		na	۷V	5.72E+03		na
Butyraldehyde	NA	NV		eu '	AN	7.38E+04		na
Benzaldehyde	NA	3.65E+02		na	۷N	1.50E+04		na
Isovaleraldehyde	NA	NV		na	AN	NA		na
Valeraldehyde	NA	N/		na	AN	ΑN		na
o,m,p-Tolualdehyde	NA	N		na	AN	ΑN		na
Hexaldehyde	NA	NV		na	۷V	ΑΝ		na
2,5-Dimethylbenzaldehyde	NA	NN		na	AN	AN		na
Acid Gases								
Hydrogen fluoride	NA	NN		eu	ΝA	1.60E+03		na
Hydrogen chloride	NA	2.08E+01		na	NA	4.50E+03		na
Hydrogen bromide	NA	NV		na	AN	9.93E+03		na
Nitric Acid	NA	NV		na	NA	5.16E+03		na
Phosphoric acid	NA	1.04E+01		na	NA	3.00E+03		na
Sulfuric Acid	NA	N/		na	NA	2.00E+03		na

Footnote:

NA = Not applicable because compound was not detected.

na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value

Contonic = Chronic time-averaged concentration; HBSL = Chronic health-based screening level

G_{acute} = Acute concentration; ATV = Acute toxicity value

Table D-41: Comparison of Air Concentrations With Health-Based Values: Cyanides and Energetics

Particulate Cyanide and Hydrogen Compound Compoun	100 meter location								
Certronic (lug/m³) Screenling Level (lug/m³) Certronic (lug/m³) 730E+01 NA 730E+01 NA 730E+01 NA 7.30E+01 NA 7.30E+01 NA 7.30E+01 NA 7.30E+01 NA 7.30E+01 NA 7.30E+02 6.24E+02 5.17E+03 1.21E-01 T.21E-01 NA 7.30E+01 na NA 1.51E+04 NA 1.21E-01 NA 3.65E+01 na NA NA NA NA NA NA 3.65E+01 na NA NA NA NA NA NA 3.65E+01 na NA NA NA NA NA NA A.36E+01 na NA NA 3.37E+04 NA NA NA A.436E+01 na NA NA 3.37E+04 NA NA NA A.436E+01 na NA NA 3.00E+03 NA NA NA A.55E+01 na NA N			155mm	propelling	charge DODI(N3A1 (zone 3)): D540	, M199 cannon		
NA 7.30E+01 na NA 5.00E+03 1.21E-01 1.40E-01 3.13E+00 4.47E-02 no 6.24E+02 5.17E+03 1.21E-01 NA 2.09E+00 na NA 1.51E+04 1.21E-01 NA 3.65E+01 na NA NA 1.21E-01 NA 3.65E+01 na NA NA 1.21E-01 NA 3.65E+01 na NA 1.71E+04 NA NA 3.65E+01 na NA NA NA NA 3.65E+01 na NA 3.0E+04 NA NA 3.65E+01 na NA 3.00E+02 NA NA 3.65E+01 na NA 3.00E+02 NA NA 1.10E+02 na NA NA NA NA NA NA NA NA NA NA 1.83E+02 na NA NA NA NA NA	Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	G _{ecute} / ATV	> 12
NA 7.30E+01 na NA 5.00E+03 1.21E-01 1.40E-01 3.13E+00 4.47E-02 no 6.24E+02 5.17E+03 1.21E-01 NA 2.09E+00 na NA 1.51E+04 1.21E-01 NA 3.65E+01 na NA NA NA NA 3.65E+01 na NA 3.37E+04 NA NA 3.65E+01 na NA 3.37E+04 NA NA 3.65E+01 na NA 3.37E+04 NA NA 4.80E-01 na NA 3.00E+03 NA NA 3.65E+00 na NA 3.00E+02 NA NA 3.65E+00 na NA 3.00E+02 NA NA 3.65E+00 na NA 3.00E+02 NA NA 1.1E-02 na NA NA NA NA 1.35E+04 na NA NA NA NA 1.6	e and Hydrogen (CN)								
1.40E-01 3.13E+00 4.47E-02 no 6.24E+02 5.17E+03 1.21E-01 NA 2.09E+00 na	Cyanide	NA	7.30E+01		na	NA	5.00E+03		na
NA 2.09E+00 ' na NA 1.51E+04 NA 3.65E+01 na NA 1.51E+04 NA 3.65E+01 na NA NA NA 3.65E+01 na NA 3.37E+04 NA 3.65E+01 na NA NA NA 3.65E+01 na NA 3.00E+03 NA 3.65E+00 na NA 6.00E+02 NA 1.10E+02 na NA 6.00E+02 NA 1.10E+02 na NA 8.00E+04 NA 1.10E+02 na NA NA NA 1.10E+02 na NA NA NA 6.11E-02 na NA 1.50E+04 NA NA 1.50E+04 na NA 1.83E+02 na NA NA NA 1.50E+04 na NA 1.50E+04 NA 1.50E+01 na NA 1.50E+04<	Cyanide	1.40E-01	3.13E+00	4.47E-02	ou	6.24E+02	5.17E+03	1.21E-01	ou
NA 2.09E+00 ' na NA 1.51E+04 NA 3.65E+01 na NA NA NA 3.65E+01 na NA NA NA 3.65E+01 na NA 3.37E+04 NA 3.65E+01 na NA 3.37E+04 NA 3.65E+01 na NA 3.00E+03 NA 3.65E+00 na NA 6.00E+02 NA 7.36E+00 na NA 6.00E+02 NA 1.10E+02 na NA 6.00E+02 NA 1.10E+02 na NA 8.00E+04 NA 1.10E+02 na NA 1.50E+04 NA 1.10E+02 na NA 1.50E+04 NA 1.83E+01 na NA 1.50E+04 NA 1.83E+02 na NA 1.50E+04 NA 1.00E+04 na NA 1.00E+04 NA 3.65E+02 na <td>efics</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	efics								
NA 3.65E+01 na NA NA NA 3.65E+01 na NA NA NA 3.65E+01 na NA 3.75E+04 NA 3.65E+01 na NA 3.75E+04 NA 4.80E-01 na NA 3.00E+03 NA 3.65E+00 na NA 6.00E+02 NA 3.65E+00 na NA 6.00E+02 NA 1.10E+02 na NA 6.00E+02 NA 1.10E+02 na NA 6.00E+02 NA 1.10E+02 na NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA 1.83E+02 na NA NA NA 3.65E+04 na NA 1.50E+04 NA 4.80E-01 na NA 1.50E+04	Nitrobenzene	AN	2.09E+00	•	na	۷A	1.51E+04		na
NA 3.65E+01 na NA NA NA 3.65E+01 na NA 3.37E+04 NA 4.80E-01 na NA NA NA 3.65E+01 na NA NA NA 3.65E+00 na NA 6.00E+02 NA 7.30E+00 na NA 6.00E+02 NA 1.10E+02 na NA 6.00E+02 NA 1.10E+02 na NA 6.00E+02 NA 1.10E+02 na NA 0.00E+04 NA 0.11E-02 na NA NA NA NA NA NA NA NA 1.83E+02 na NA NA NA 1.50E+04 na NA 1.50E+04 NA 4.80E-01 na NA 1.50E+04 NA 4.80E-01 na NA 1.00E+04 NA 9.13E+01 na NA 1.00E+04	oluene	NA	3.65E+01		na	AN	AN		na
NA 3.65E+01 na NA 3.37E+04 NA 4.80E-01 na NA NA NA 3.65E-01 na NA 3.00E+03 P NA 3.65E+00 na NA 6.00E+02 P NA 7.30E+00 na NA 6.00E+02 P NA 1.10E+02 na NA 6.00E+02 P NA 1.10E+02 na NA NA NA NA 6.11E-02 na NA NA NA NA NA NA NA NA NA NA 1.83E+02 na NA NA NA NA 1.83E+02 na NA 1.50E+04 NA NA 3.65E+02 na NA 1.50E+04 NA NA 4.80E-01 na NA 1.50E+04 NA NA 4.80E-02 na NA 1.50E+04 NA	3-Nitrotoluene	AN	3.65E+01		ua	AN	NA		na
NA 4.80E-01 na NA 3.05E+03 na NA 3.00E+03 na NA 3.65E+00 na NA 6.00E+02 na na 0.00E+02 na NA 7.30E+00 na NA 6.00E+02 na na 0.00E+04 na	4-Nitrotoluene	NA	3.65E+01		na	۷V	3.37E+04		na
NA 3.65E-01 na NA 3.00E+03 R NA 3.65E+00 na NA 6.00E+02 R NA 7.30E+00 na NA 6.00E+02 R NA 1.10E+02 na NA 6.00E+02 R NA 1.10E+02 na NA 2.50E+04 R NA NA NA NA NA NA NA NA NA NA NA NA NA 1.83E+02 na NA NA NA NA 1.50E+04 na NA NA NA NA 1.83E+02 na NA 1.50E+04 R NA 3.65E+02 na NA 1.50E+04 R NA 3.65E+02 na NA 1.50E+04 R NA 4.80E-01 na NA 1.00E+04 R NA 9.13E+01 na NA 1.00E+04	Nitroglycerine	NA	4.80E-01		na	AN	NA		na
NA 3.65E+00 na NA 6.00E+02 R NA 7.30E+00 na NA 6.00E+02 R NA 1.10E+02 na NA 2.50E+04 R NA 6.11E-02 na NA NA NA NA NV NA NA NA R NA NV na NA NA NA NA 1.83E+02 na NA NA NA NA 3.65E+02 na NA NA NA NA 3.65E+02 na NA 1.50E+04 NA NA 3.65E+02 na NA 1.50E+04 NA NA 3.65E+02 na NA 1.50E+04 NA NA 4.80E-01 na NA 1.00E+04 NA	1,3-Dinitrobenzene	NA	3.65E-01		na	AN	3.00E+03		na
NA 7.30E+00 na NA 6.00E+02 R NA 1.10E+02 na NA 3.00E+04 R NA 2.24E-01 na NA 2.50E+04 R NA 6.11E-02 na NA NA NA NA NV na NA NA NA NA 1.83E+02 na NA NA NA NA 1.83E+02 na NA 1.50E+01 NA NA 3.65E+02 na NA 1.50E+01 NA NA 4.80E-01 na NA 1.00E+04 NA NA 9.13E+01 na NA 3.00E+04 NA	2,6-Dinitrotoluene	NA	3.65E+00		na	NA	6.00E+02		na
NA 1.10E+02 na NA 3.00E+04 N NA 2.24E-01 na NA 2.50E+04 N NA 6.11E-02 na NA NA NA NA NV NA NA NA NA NA 1.83E+02 na NA NA NA NA 1.83E+02 na NA 5.00E+01 N NA 3.65E+02 na NA 1.50E+04 N NA 4.80E-01 na NA 1.00E+04 N NA 9.13E+01 na NA 3.00E+04 N	2,4-Dinitrotoluene	ΝΑ	7.30E+00		na	ΑN	6.00E+02		na
NA 2.24E-01 na NA 2.50E+04 NA NA 6.11E-02 na NA NA NA NA NV na NA NA NA NA 1.83E+02 na NA NA NA NA 3.65E+02 na NA 5.00E+01 NA NA 3.65E+02 na NA 1.50E+04 NA NA 4.80E-01 na NA 1.00E+04 NA NA 9.13E+01 na NA 3.00E+04 NA	openzene	ΑΝ	1.10E+02		na	NA	3.00E+04		na
NA 6.11E-02 na NA NA NA NV NA NA NA NA 3.65E+01 na NA 1.50E+04 NA NA 1.83E+02 na NA NA NA NA NA na NA 5.00E+01 NA NA 3.65E+02 na NA 1.50E+04 NA NA 4.80E-01 na NA 1.00E+04 NA NA 9.13E+01 na NA 3.00E+04 NA	rotoluene	AN	2.24E-01		na	NA	2.50E+04		na
NA NV NA NA<	RDX	NA	6.11E-02		eu	NA	NA		na
NA NV NA 1.50E+04 NA NA 3.65E+01 na NA NA NA 1.83E+02 na NA NA NA 3.65E+02 na NA 5.00E+01 NA 3.65E+02 na NA 1.50E+04 NA 4.80E-01 na NA 1.00E+04 NA 9.13E+01 na NA 3.00E+04	4-Amino-2,6-Dinitrotoluene	NA	N			۷N	ΑΝ		
NA 3.65E+01 na NA NA NA 1.83E+02 na NA NA NA 3.65E+02 na NA 1.50E+04 NA 4.80E-01 na NA 1.00E+04 NA 9.13E+01 na NA 3.00E+04	Initrotoluene	ΑN	N/			NA	1.50E+04		
NA 1.83E+02 na NA NA NA 5.00E+01 NA NA 3.65E+02 na NA 1.50E+04 NA NA 4.80E-01 na NA 1.00E+04 NA NA 9.13E+01 na NA 3.00E+04 NA	Tetryi	NA	3.65E+01		na	NA	NA		na
NA NV na NA 5.00E+01 NA NA 3.65E+02 na NA 1.50E+04 NA NA 4.80E-01 na NA 1.00E+04 NA NA 9.13E+01 na NA 3.00E+04 NA	HMX	NA	1.83E+02		eu	NA	NA		na
NA 3.65E+02 na NA 1.50E+04 NA 4.80E-01 na NA 1.00E+04 NA 9.13E+01 na NA 3.00E+04	Pentaerythritoltetranitrate	AN A	N/		eu	NA	5.00E+01		na
NA 4.80E-01 na NA 1.00E+04 na NA 3.00E+04 na NA 3.00E+04	Dibutyl phthalate	NA	3.65E+02		na	NA	1.50E+04		na
NA 9.13E+01 na NA 3.00E+04	Dioctyl phthalate	NA	4.80E-01		na	NA	1.00E+04		na
	Diphenylamine	NA	9.13E+01		eu	NA	3.00E+04		na

Footnote:

NA = Not applicable because compound was not detected.

na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value

Cchronic = Chronic time-averaged concentration; HBSL = Chronic health-based screening level

Cacute = Acute concentration; ATV = Acute toxicity value

M3risk1.xls

Table D-42: Comparison of Air Concentrations With Health-Based Values: Total Petroleum Hydrocarbons 100 meter location

100 High location				
	155mm pi	155mm propelling charge M3A1 (zone 3), M199 cannon DODIC: D540	arge M3A1 (zone 3), M1 DODIC: D540	99 cannon
Compound (a)	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)	G _{chronic} (µg/m³)	С _{сhronic} (µg/m³)
	Allphatic:C<=8	Allphatic:C>8	Aromatic:C<=8	Aromatic:C>8
Benzene	AN	NA	2.17E-02	NA
Toluene	NA	NA	1.06E-03	NA
naphthalene	NA	· NA	NA	1.09E-03
acenaphthylene	NA	NA	AN	1.80E-04
acenaphthene	NA	NA	ΫN	2.03E-05
fluorene	NA	NA	VΝ	7.06E-05
phenanthrene	NA	AN	ΥN	1.21E-04
anthracene	NA	NA	NA	1.49E-05
Total (µg/m³)	0.00E+00	0.00E+00	2.27E-02	1.50E-03
Derived Health-Based Screening Level	1.92E+04	1.04E+03	4.17E+02	2.09E+02
$C_{ m chronlc}/{ m HBSL}$	0.00E+00	0.00E+00	5.45E-05	7.19E-06
>1?	no	no	OU	ou
Footnotes: >1? = Is the ratio greater than one?				
NA = Not Applicable because compound was not detected	cted			
C _{chronic} = chronic averaged air Concentration (not adjust HBSL = Health-Based Screening Level	(not adjusted for cancer averaging time of 70 years)	ling time of 70 years)		

RISK EVALUATION DATA FOR CHARGE M3A1, FIRED FROM THE M199 CANNON, ZONE 3, 200 METERS DOWNWIND

Table D-43: Comparison of Air Concentrations With Health-Based Values: Gases, Particulates and Metals 200 meter location

					10 - 12 - 20	******		
			propalling	Doll	arge msA1 (zone 3), Döble: D640	155mm propelling charge msAT (20ne 3), M199 cannon DODIC: DAG		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 17	С _{асиіе} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	>12
Gases								
NH ₃	6.19E-01	1.04E+02	5.93E-03	on O	6.91E+02	1.75E+04	3.95E-02	10
Carbon Dloxide (CO ₂)	1.06E+01	N<		na	4.74E+04	5.40E+07	8.77E-04	00
Carbon Monoxide (CO)	2.82E+01	1.57E+02	1.80E-01	no	3.15E+04	2.30E+05	1.37E-01	OU
Nitrogen Oxides (as NO)	NA	1.00E+02		na	NA	2.70E+05		na
Methane (CH ₄)	NA	N		na	AN	3.30E+06		na
Sulfur Dloxide (SO ₂)	NA	8.00E+01		ua	NA	7.89E+02		na
Combined Particulate								
TSP	9.04E-01	5.00E+01	1.81E-02	2	1.01E+03	AN		na
PM ₁₀	6.42E-01	5.00E+01	1.28E-02	ou	7.17E+02	NA		na
PM _{2,5}	3.48E-01	1.50E+01	2.32E-02	2	3.88E+02	AN		na
Metals								
Antimony	NA	1.46E+00		na	AA	1.50E+03		na
Arsenic	8.77E-06	4.47E-04	1.96E-02	ou	9.13E-02	3.00E+01	3.04E-03	ou
Barlum	4.37E-04	5.21E-01	8.39E-04	ou	1.95E+00	1.50E+03	1.30E-03	20
Beryllium	NA	8.00E-04		na	NA	5.00E+00		na
Cadmium	6.57E-06	1.07E-03	6.16E-03	uo Ou	6.85E-02	3.00E+01	2.28E-03	no
Chromium	5.23E-05	1.53E-04	3.43E-01	90	5.45E-01	1.50E+03	3.63E-04	no
Cobalt	1.07E-05	2.20E+02	4.87E-08	0	4.78E-02	6.00E+01	7.97E-04	no
Copper	1.19E-01	1.46E+02	8.17E-04	9	5.33E+02	3.00E+03	1.78E-01	no
Lead	3.51E-03	1.50E+00	2.34E-03	00	1.57E+01	1.50E+02	1.05E-01	no
Manganese	3.90E-04	5.11E-02	7.62E-03	00	1.74E+00	3.00E+03	5.80E-04	no
Nickel	2.13E-10	7.30E+01	2.92E-12	입	9.52E-01	3.00E+03	3.17E-04	200
Selenium	NA	1.83E+01		na	AN	6.00E+02		na
Silver	9.58E-12	1.83E+01	5.25E-13	no	4.28E-02	3,00E+02	1.43E-04	ou
Thallium	NA	2.56E-01		na	NA	3.00E+02		na
Zinc	2.56E-08	1.10E+03	2.34E-11	o O	1.14E+02	3.00E+04	3.81E-03	no
Footnote:					`			

NA = Not applicable because compound was not detected.

na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value

 $C_{chronic} = Chronic time-averaged concentration; HBSL = Chronic health-based screening level <math>C_{acute} = Acute$ concentration; ATV = Acute toxicity value

1/16/01

Table D-44: Comparison of Air Concentrations With Health-Based Values: Volatile Organic Compounds 200 meter location

ZOU METER TOCAMON		And the second control of the second control						
		165mm pro		arge M DODIC	arge M3A1 (zone 3), DODIC: D540	155mm propelling charge M3A1 (zone 3), M199 cannon bObic: D540		
Compound (a)	С _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronle} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	C _{acute} / ATV	> 1?
VOCS								
Dichlorodifluoromethane	AN	2.09E+02		na	NA	1.48E+07		na
Methyl Chloride	AN	1.07E+00		na	NA	2.06E+05		na
Dichlorotetrafluoroethane	AN	N		na	NA	AN		na
Vinyi Chloride	Ā	2.20E-02	•	na	NA	1.28E+04		na
1,3-Butadlene	AN	3.74E-03		na	NA	2.20E+04		na
Methyl Bromide	Ā	5.21E+00		na	NA	5.82E+04		na
Ethyl Chloride	Ā	2.32E+00		na	NA	7.92E+06		na
Trichlorofluoromethane	AN	7.30E+02		na	NA	2.81E+06		na
1.1-Dichloroethene	4,24E-04	5.21E+02	8.14E-07	on	4.74E-01	7.92E+04	5.98E-06	no
Dichloromethane	1.54E-02	4.09E+00	3.77E-03	on	4.02E+01	6.96E+05	5.77E-05	no
3-Chloropropene	AN	1.04E+00		na	NA	9.39E+03		na
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	3.13E+04		na	NA	9.58E+06		na
1,1-Dichloroethane	ΝA	5.21E+02		na	NA	1.21E+06		na
cis-1,2-Dichloroethene	NA AA	3.65E+01		na	NA	7.92E+05		na
Trichloromethane	Ϋ́	8.35E-02		na	NA	9.76E+03		na
1,2-Dichloroethane	Ā	7.39E-02		na	NA	8.08E+03		na
1,1,1-Trichioroethane	ΑN	1.04E+03		na	NA	1.94E+06		na
Benzene	4.45E-03	2.49E-01	1.79E-02	no	1.16E+01	1.56E+05	7.43E-05	no
Carbon Tetrachloride	NA	1.28E-01		na	A'N	1.28E+05		na
1,2-Dichloropropane	NA	9.89E-02		na	A'A	5.08E+05		na
Trichloroethene	NA	1.12E+00		na	AA A	5.38E+05		па
cis-1,3-Dichloropropene	NA	5.17E-02		na	Ą	1.14E+04		na
trans-1,3-Dichloropropene	NA	5.17E-02		na	NA V	NA		na
1,1,2-Trichloroethane	NA	1.20E-01		na	A A	1.64E+05		na
Toluene	5.07E-04	4.02E+02	1.26E-06	no	5.66E-01	1.88E+05	3.02E-06	no
1,2-Dibromoethane	NA	8.73E-03		na	NA	1.54E+05		na
Tetrachloroethene	NA	3.31E+00		na	AN	6.78E+05		na
Chlorobenzene · · ,	NA	6.21E+01		na	Ϋ́	1.38E+05		na
Ethylbenzene	NA	1.06E+03		na	ĄN	5.43E+05		na
m&p-Xylene	NA	7.30E+02		na	₹ V	6.51E+05		na

Table D-44: Comparison of Air Concentrations With Health-Based Values: Volatile Organic Compounds 200 meter location

		A SERVICE LAND	walliam all	A Visite As	AND CAME OF	PANAL STATE	2.5.2	
	A Commence of the Commence of			ODIG	Dodice Bad			
Compound (a)	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 12	Cacute (µg/m³)	Acute Toxicity Value (µg/m³)	C _{acute} / ATV	> 12
Styrene	NA	1.06E+03		па	ΑN	2.13E+05		na
1,1,2,2-Tetrachloroethane	AN	3.31E-02		Бa	A A	2.06E+04		na
o-Xylene	NA	7.30E+02		na	NA	6.51E+05		na
4-Ethyltoluene	NA	N		na	NA	1.25E+05		na
1,3,5-Trimethylbenzene	NA	6.21E+00		na	NA	3.68E+05		na
1,2,4-Trimethylbenzene	NA	6.21E+00		na	AA	1.80E+05		na
Benzyl Chloride	NA	3.96E-02		na	NA	5.20E+03		na
m-Dichlorobenzene	NA	3.29E+00		na	NA	3.61E+04		na
p-Dichlorobenzene	NA	3.06E-01		na	NA	6.61E+05		na
o-Dichlorobenzene	NA	2.09E+02		na	AA	3.01E+05		na
1,2,4-Trichlorobenzene	NA	2.08E+02		na	NA	3.71E+04		na
Hexachlorobutadiene	NA	8.62E-02		na	Ą	3.21E+04		na
Hydrocarbons								
Methane	1.51E-01	N/		na	6.74E+02	3.30E+06	2.04E-04	no
Ethane	NA	NV		na	AN	AA		na
Ethylene	NA	N<		na	ΝΑ	4.60E+05		Па
Propane	AA	N<		na	۸A	3.78E+06		na
Acetylene	NA	N/		na	ΝΑ	NA		na
Isobutane	ΝA	N<		na	NA	9.52E+05		na
n-Butane	NA	N		na	NA	5.71E+06		na
Propylene	NA	\ \ \		na	ΑN	NA		na
ootpotoo.								

Footnotes:

NA = Not applicable

na = Not available because health-based screening value is not available or not applicable because compound was not detected.

NV = No value

C_{chronic} = Chronic time-averaged concentration

HBSL = Chronic health-based screening level

Cacute = Acute concentration

Table D-45: Comparison of Air Concentrations With Health-Based Values: Semi-Volatile Organic Compounds 200 meter location

ZUU Meter location		A Market	The state of the s	A STATE OF THE STA				
		155mm pro	obelling c	BODIC	arge M3A1 (zone 3), DODIC: D540	155mm propelling charge M3A1 (zone 3), M199 cannon DOBIC: D540		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronlc} / HBSL	> 1?	Cacute (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
SVOCS								
n-nitrosodimethylamine	NA	1.37E-04		na	NA	2.50E+03		na
bis(2-chloroethyl)ether	NA	5.82E-03		na	NA	5.85E+04		na
phenol	2.44E-03	2.19E+03	1.12E-06	no	1.09E+01	3.85E+04	2.83E-04	no
2-chlorophenol	ΑN	1.83E+01		na	NA	5.25E+03		na
1,3-dichlorobenzene	ĄN	3.29E+00		na	NA	3.61E+04		na
1,4-dichlorobenzene	ΑN	3.06E-01		na	NA	6.61E+05		na
1,2-dichiorobenzene	AN	2.09E+02		na	NA	3.01E+05		na
benzyl alcohol	ΑN	1,10E+03		na	NA	5.53E+04		na
bis(2-chlorolsopropyl)ether	NA	1.92E-01		na	NA	6.99E+04		na
2-methylphenol	ΑN	1.83E+02		na	NA	۸A		na
hexachloroethane	۸A	4.80E-01		na	NA	2.90E+04		na
n-nitroso-di-n-propylamine	NA	9.61E-04		na	Ϋ́	2.00E+02		na
4-methylphenol	AN	1.83E+02		na	Y Y	AA		na
nitrobenzene	AN	2.09E+00		na	NA	1.51E+04		na
Isophorone	NA	7.08E+00		na	¥	2.83E+04		na
2-nitrophenol	NA	N		na	Ā	Ä		na
2,4-dimethylphenol	NA	7.30E+01		na	NA	AN		na
bls(2-chloroethoxy)methane	NA	N		na	۸A	¥.		na
2,4-dichlorophenol	NA	1.10E+01		na	AA	3.00E+04		na
1,2,4-trichlorobenzene	NA	2.08E+02		na	AA	3.71E+04		na
naphthalene	5.24E-04	3.13E+00	1.67E-04	9	2.34E+00	7.86E+04	2.98E-05	92
4-chloroaniline	NA	1.46E+01		В	AA	3.00E+04		na
hexachlorobutadiene	NA	8.62E-02		na	AA	3.21E+04		na
4-chloro-3-methylphenol	NA	N		па	۸A	2.00E+04		na
2-methylnaphthalene	NA	7.30E+01		na	ΑN	2.00E+04		na
hexachtorocyclopentadlene	NA	7.30E-02		na	NA NA	2.23E+02		na
2,4,6-trichlorophenol	NA	1.10E+02		na	AA	NA A		na
2,4,5-trichlorophenol	NA	3.65E+02		na	Ϋ́	3.00E+04		na
2-chloronaphthalene	NA	2.92E+02		na	A A	6.00E+02		na
2-nitroaniline	NA	2.09E-01		na	NA	NA		na
dimethylphthalate	NA	3.65E+04		na	NA	1.50E+04		na
2,6-dinitrotoluene	AN	3.65E+00		na	AN	6.00E+02		na

Table D-45: Comparison of Air Concentrations With Health-Based Values: Semi-Volatile Organic Compounds 200 meter location

		າອີກາກ pr	opelling of	rarge N DODIC	arge M3A1 (zone 3), DODIC: D540	155mm propelling charge M3A1 (zone 3), M199 cannon DODIC: DS40		
Compound	С _{сһтопіс} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Gacute/ ATV	> 12
3-nitroaniline	NA	>N		na	ΑN	9.00E+03		200
2,4-dinitrophenoi	NA	7.30E+00		na	AN	7.50E+03		9
dibenzofuran	NA	1.46E+01		na	¥	AN		ed
2,4-dinitrotoluene	NA .	7.30E+00		na	AN	6.00E+02		e
4-nitrophenol	NA	2.92E+01		na	ΑN	3.00E+04		2
4-chlorophenyl-phenytether	NA	N/		na	AA	AN.		ec
diethylphthalate	NA	2.92E+03		na	AN	1.50E+04		<u> </u>
4-nltroanlline	NA	N		na	ΑΝ	9.00E+03		e c
4,6-dinitro-2-methylphenol	NA	3.65E-01		na	AN	5.00E+02		2 0
n-nitrosodiphenylamine(1)	NA	1.37E+00		na	¥	NA		0
4-bromophenyl-phenylether	NA	N		na	AN	AN AN		a c
hexachlorobenzene.	NA	4.18E-03		eu	ΑΝ	7.50E+01		9
pentachlorophenol	NA	5.60E-02		na	ΑN	1.50E+03		e c
di-n-butyiphthalate	NA	3.65E+02		па	AN	1.50E+04		ē
butylbenzylphthalate	NA	7.30E+02		na	AN	5.00E+05		g
bis(2-ethylhexyl)phthalate	NA	4.80E-01		a	NA	1.00E+04		g
di-n-octylphthalate	NA	7.30E+01		a	AA	1.50E+05		eu
potnotes:								

NA = Not applicable

na = Not available because health-based screening value is not available or not applicable because compound was not detected.

NV = No value

C_{chronic} = Chronic time-averaged concentration

HBSL = Chronic health-based screening level

Cacule = Acute concentration

Table D-46: Comparison of Air Concentrations With Health-Based Values: PAHs, Dioxins/Furans, Aidehydes, and Acid Gases

		155mm	propelling	flarge DODIC	155mm propelling charge M3A1 (zone 3), M199 cannon - Bobic: D540	M199 cannon		
Compound	С _{сһґопіс} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	>12
PAHs								
acenaphthylene	8.62E-05	NN		na	3.85E-01	2.00E+02	1.92E-03	no
acenaphthene	9.72E-06	2.19E+02	4.44E-08	no	4.34E-02	1.25E+03	3.47E-05	no On
fluorene	3,38E-05	1.46E+02	2.31E-07	no	1.51E-01	7.50E+04	2.01E-06	ou
phenanthrene	5.79E-05	N/		na	2.59E-01	2.00E+03	1.29E-04	01
anthracene	7.13E-06	1.10E+03	6.51E-09	ou .	3.18E-02	6.00E+03	5.31E-06	ou
fluoranthene	3.20E-05	1.46E+02	2.19E-07	no	1.43E-01	3.00E+01	4.77E-03	on On
pyrene	7.70E-05	1.10E+02	7.03E-07	no	3.44E-01	1.50E+04	2.29E-05	02
benzo(a)anthracene	1.85E-06	2.17E-02	8.55E-05	u	1.93E-02	6.00E+02	3.22E-05	no
chrysene	2.26E-06	2.17E+00	1.04E-06	uo	2.36E-02	2.00E+02	1.18E-04	ou
benzo(b)fluoranthene	6.59E-06	2.17E-02	3.04E-04	no	1.72E-02	AN		na
benzo(k)fluoranthene	4.26E-06	2.17E-01	1.96E-05	no	1.11E-02	NA		na
benzo(a)pyrene	8.42E-06	2.17E-03	3.88E-03	no	8.78E-02	7.50E+03	1.17E-05	on
indeno(1,2,3-cd)pyrene	1.50E-05	2.17E-02	6.94E-04	no	3.92E-02	NA A		na
dlbenz(a,h)anthracene	4.72E-07	2.17E-03	2.17E-04	no	4.91E-03	3.00E+04	1.64E-07	200
benzo(g,h,l)perylene	6.87E-05	N N		na	3.07E-01	3.00E+04	1.02E-05	no
Dioxins / Furans								
2378-Tetrachlorodibenzo-p-dioxin	NA	4.48E-08		na	NA	3.50E+00		na
12378-Pentachlorodibenzo-p-dloxin	5.90E-11	R		na	2.63E-07	2.50E+00	1.05E-07	no
123478-Hexachlorodibenzo-p-dioxin	AA	N		na	NA	NA		na
123678-Hexachlorodibenzo-p-dioxin	1.68E-10	Š		na	7.48E-07	1.50E+01	4.99E-08	ou
123789-Hexachlorodibenzo-p-dloxin	8.07E-11	1.48E-06	5.46E-05	10	2.10E-07	NA		na
1234678-Heptachlorodibenzo-p-dloxin	1.67E-09	N		na	1.87E-06	ΝΑ		na
Octachlorodibenzo-p-dioxin	6.55E-09	≥N		na	7.31E-06	NA		na
2378-Tetrachlorodibenzo-p-furan	NA	2		na	NA	2.00E+00		na
12378-Pentachlorodibenzo-p-furan	AN	Ž		na	NA	NA		na
23478-Pentachlorodibenzo-o-furan	AA	Š		na	NA	7.50E-02		na
123478-Hexachlorodibenzo-p-furan	2.99E-11	Š		na	1.34E-07	7.50E+00	1.78E-08	01
123789-Hexachiorodibenzo-p-furan	NA	N		na	NA	. NA		na
234678-Hexachlorodibenzo-p-furan	AA	N N		na	NA	1.50E+00		na
1234678-Heptachlorodibenzo-p-furan	1.10E-10	N		na	1.23E-07	NA		na
1234789-Heptachtorodibenzo-p-furan	. NA	N/		na	NA	NA		na
OCDF	2.18E-10	N		na	2.43E-07	NA		na
Aldehydes								
Formaldehyde	AA	1.48E-01		na	ΑΝ	1.23E+03		na

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Table D-46: Comparison of Air Concentrations With Health-Based Values: PAHs, Dioxins/Furans, Aldehydes, and Acid Gases 200 meter location

		135mm	propelling	charge N Dodio	arge M3AT (zone 3), Dodic: D540	155mm propelling charge M3A7 (zone 3), M199 cannon DoDic: D540	Andrew Commence of the Commenc	
Compound	С _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	G _{chronic} / HBSL	> 12	С _{асиtе} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
Acetaldehyde	AN	8.73E-01		na	ĄN	1.80E+04		na
Acetone	Ą	3.65E+02		na	NA	2.37E+08		na
Acrolein	AN	2.09E-02		na	۸A	2.30E+02		na
Proprionaldehyde	AN	N N		na	NA	7.50E+04		na
Crotonaldehyde	NA	3.54E-03		na	NA	5.72E+03		na
Butyraldehyde	NA	N		, na	NA	7.38E+04		na
Benzaldehyde	NA	3.65E+02		na	NA	1.50E+04		na
Isovaleraldehyde	AN	N		na	NA	NA		na
Vateraldehyde	AN	N N		na	NA	AN		na
o,m,p-Tolualdehyde	NA	N		na	NA	NA		na
Hexaldehyde	AN	N		na	AN	AN		na
2,5-Dimethylbenzaldehyde	AN	N/	,	na	AN	AN		na
Acid Gases								
Hydrogen fluoride	AN	NV		ua	AN	1.60E+03		na
Hydrogen chloride	AN	2.08E+01		na	AN	4.50E+03		na
Hydrogen bromide	NA	NV		na	AN	9.93E+03		na
Nitric Acid	AN	N		na	NA	5.16E+03		na
Phosphoric acid	NA	1.04E+01		na	NA	3.00E+03		na
Sulfuric Acid	NA	N/		na	NA	2.00E+03		na
-cooper								

Footnote:

NA = Not applicable because compound was not detected.

na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value

Cohronic = Chronic time-averaged concentration; HBSL = Chronic health-based screening level

Cacute = Acute concentration; ATV = Acute toxicity value

Table D-47: Comparison of Air Concentrations With Health-Based Values: Cyanides and Energetics

ZUU Meter location		155mm	propelling	harge I	large M3A1 (zone 3), DODIC: D540	155mm propelling charge M3A1 (zone 3), M199 cannon DODIC: D540			
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} /	> 12	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12	
Particulate Cyanide and Hydrogen Cyanide (CN)									
Particulate Cyanide	AN	7.30E+01		na	ΑN	5.00E+03		na	
Hydrogen Cyanide	6.69E-02	3.13E+00	2.14E-02	no	2.99E+02	5.17E+03	5.78E-02	no	
Energetics									
Nitrobenzene	NA	2.09E+00	•	na	NA	1.51E+04		na	
2-Nitrotoluene	NA	3.65E+01		na	NA	NA		na	
3-Nitrotoluene	AN	3.65E+01		na	NA	NA		na	
4-Nitrotoluene	NA	3.65E+01		na	NA	3.37E+04		na	_
Nitroglycerine	NA	4.80E-01		na	NA	NA		na	_
1,3-Dinitrobenzene	AN	3.65E-01		na	NA	3.00E+03		na	
2,6-Dinitrotoluene	NA	3.65E+00		na	NA	6.00E+02		na	
2,4-Dinitrotoluene	NA	7.30E+00		na	NA	6.00E+02		na	
1,3,5-Trinitrobenzene	NA	1.10E+02		na	NA	3.00E+04		na	_
2,4,6-Trinitrotoluene	NA	2,24E-01		na	NA	2.50E+04		na	_
RDX	NA	6.11E-02		na	NA	NA		na	_
4-Amino-2,6-Dinitrotoluene	NA	N			NA	NA			_
2-Amino-4,6-Dinitrotoluene	NA	N			NA	1.50E+04			_
Tetryl	AN	3.65E+01		na	NA	NA		na	
HMX	AN	1.83E+02		na	NA	AN		na	_
Pentaerythritoitetranitrate	NA	NV		na	NA	5.00E+01		na	_
Dibutyl phthalate	NA	3.65E+02		na	NA	1.50E+04		na	
Dioctyl phthalate	NA	4.80E-01		na	NA	1.00E+04		na	
Diphenylaminė	NA	9.13E+01		na	NA	3.00E+04		na	_
Footnote:	name and detected								

NA = Not applicable because compound was not detected.
na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value

Cehronic = Chronic time-averaged concentration; HBSL = Chronic health-based screening level

Cacute = Acute concentration; ATV = Acute toxicity value

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Table D-48: Comparison of Air Concentrations With Health-Based Values: Total Petroleum Hydrocarbons 200 meter location

	င် ယျာင္သင္)	155mm propeilling charge M3A1 (zone 3), M199 cannon D©DIC: D640	arge M3A1 (zone 3), M1 D@DIC: D£40	99 cannon
Compound (a)	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)
	Allphatic:C<=8	Allphatic:C>8	Aromatic: C<=8	Aromatic:C>8
Benzene	NA	NA	1.04E-02	NA
Toluene	NA	NA	5.07E-04	NA
naphthalene	NA	· NA	NA	5.24E-04
acenaphthylene	NA	NA	NA	8.62E-05
acenaphthene	NA.	. AN	AN	9.72E-06
fluorene	NA	AN	NA	3.38E-05
phenanthrene	NA	NA	NA	5.79E-05
anthracene	NA	NA	NA	7.13E-06
Total (µg/m³)	0.00E+00	0.00E+00	1.09E-02	7.18E-04
Derived Health-Based Screening Level	1.92E+04	1.04E+03	4.17E+02	2.09E+02
C _{chronic} /HBSL	0.00E+00	0.00E+00	2.61E-05	3.44E-06
>12	no	no	no	OU
Footnotes:				

>1? = Is the ratio greater than one?

NA = Not Applicable because compound was not detected

Cchronic = chronic averaged air Concentration (not adjusted for cancer averaging time of 70 years)

HBSL = Health-Based Screening Level

RISK EVALUATION DATA FOR CHARGE M3A1, FIRED FROM THE M284 CANNON, ZONE 3, 100 METERS DOWNWIND

Table D-49: Comparison of Air Concentrations With Health-Based Values: Gases, Particulates and Metals

		155Imm	propelling	charge Dobit	arge M3A1 (zone 3), DODIC: D540	155Inim propelling charge M3A1 (zone 3), M284 cannon DODIC: 0540		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	C _{acute} / ATV	> 12
Gases								
NH ₃	1.89E+00	1.04E+02	1.81E-02	no	2.11E+03	1.75E+04	1.21E-01	no Or
Carbon Dioxide (CO ₂)	2.09E+01	NV		na	9.34E+04	5.40E+07	1.73E-03	5
Carbon Monoxide (CO)	5.66E+01	1.57E+02	3.61E-01	ou	6.32E+04	2.30E+05	2.75E-01	no
Nitrogen Oxides (as NO)	1.01E+00	1.00E+02	1.01E-02	ou	4.51E+03	2.70E+05	1.67E-02	ou
Methane (CH ₄)	NA	N		na	NA	3.30E+06		na
Sulfur Dioxide (SO ₂)	NA	8.00E+01		na	AN	7.89E+02		na
Combined Particulate								
TSP	2.00E+00	5.00E+01	4.00E-02	no	2.23E+03	AN		na
PM ₁₀	1.77E+00	5.00E+01	3.55E-02	ou	1.98E+03	NA		na
PM _{2.5}	9.93E-01	1.50E+01	6.62E-02	잂	1.11E+03	NA		na
Metals								
Antimony	AN	1.46E+00		na	NA	1.50E+03		na
Arsenic	2.93E-05	4.47E-04	6.56E-02	ou	3.05E-01	3.00E+01	1.02E-02	01
Barlum	1.58E-03	5.21E-01	3.03E-03	ou	7.07E+00	1.50E+03	4.71E-03	92
Beryllium	NA	8.00E-04		na	AN	5.00E+00		na
Cadmium	AN	1.07E-03		ua	NA	3.00E+01		na
Chromium	6.19E-05	1.53E-04	4.06E-01	90	6.46E-01	1.50E+03	4.30E-04	no
Cobalt	2.19E-05	2.20E+02	9.96E-08	ou	9.79E-02	6.00E+01	1.63E-03	02
Copper	7.77E-02	1.46E+02	5.32E-04	2	3.47E+02	3.00E+03	1.16E-01	5
Lead	5.58E-03	1.50E+00	3.72E-03	2	2.49E+01	1.50E+02	1.66E-01	01
Manganese	4.79E-04	5.11E-02	9.38E-03	입	2.14E+00	3.00E+03	7.13E-04	ou
Nickel	2.24E-10	7.30E+01	3.06E-12	01	9.99E-01	3.00E+03	3.33E-04	01
Selenium	NA	1.83E+01		na	NA	6.00E+02		na
Silver	ΑΝ	1.83E+01		na	NA	3.00E+02		na
Thallium	NA	2.56E-01		na	NA	3.00E+02		na
Zinc	1.47E-08	1.10E+03	1.34E-11	no	6.55E+01	3.00E+04	2.18E-03	on
Controle:								

Footnote:

NA = Not applicable because compound was not detected.

na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No vafue

 C_{chronic} = Chronic time-averaged concentration; HBSL = Chronic health-based screening level C_{scute} = Acute concentration; ATV = Acute toxicity value

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Table D-50: Comparison of Air Concentrations With Health-Based Values: Volatile Organic Compounds

100 meter location								
		155mm pro	ha gilling ch	arge M3A1 (z DODIC: D540	3A1 (zone 3), : D540	155mm propelling charge M3A1 (zone 3), M284 cannon BODIC: D540	(2) (3) (3) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4	
Compound (a)	С _{сhranic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	Cacute (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 1?
VOCs								
Dichlorodifluoromethana	Ą	2.09E+02		na	NA	1.48E+07		na
Mathyl Chlorida	NA A	1.07E+00		na	NA	2.06E+05		na
Dichlorotetraflioroethane	AN AN	2		na	AN	NA		na
Vinyl Chloride	AN N	2.20E-02		na	NA	1.28E+04		na
1.3-Butadlene	¥.	3.74E-03		na	NA	2.20E+04		na
Methyl Bromide	AA	5.21E+00		na	NA	5.82E+04		na
Ethyl Chlorida	ĀN	2.32E+00		na	NA	7.92E+06		na
Trichlorofluoromethane	A N	7.30E+02		na	NA	2.81E+06		na
1.1-Dichloroethene	lÒ	5.21E+02	4.44E-07	no	2.58E-01	7.92E+04	3.26E-06	2
Dichloromethane	6.67E-03	4.09E+00	1.63E-03	ou	1.74E+01	6.96E+05	2.50E-05	2
3-Chloropropene	ΑN	1.04E+00		na	NA	9.39E+03		na
1.1.2-Trichtoro-1.2.2-trifluoroethane	ΑΝ	3.13E+04		na	NA	9.58E+06		na
1.1-Dichloroethane	AA	5.21E+02		na	NA A	1.21E+06		na
cls-1.2-Dichloroethene	AN	3.65E+01		na	NA	7.92E+05		na
Trichloromethane	AN	8.35E-02		na	NA	9.76E+03		na
1.2-Dichloroethane	NA	7.39E-02		na	AN	8.08E+03		na
1.1.1-Trichloroethane	1.54E-03	1.04E+03	1.48E-06	no	1.72E+00	1.94E+06	8.85E-07	9
Benzene	2.22E-03	2.49E-01	8.91E-03	no	5.78E+00	1.56E+05	3.71E-05	2
Carbon Tetrachloride	NA	1.28E-01		na	AN	1.28E+05		na
1,2-Dichloropropane	NA	9.89E-02		na	AN	5.08E+05		na
Trichloroethene	AN	1.12E+00		В	AN	5.38E+05		na
cis-1,3-Dichloropropene	NA	5.17E-02	·	па	Ā	1.14E+04		na
trans-1,3-Dichloropropene	NA	5.17E-02		na	AN N	AA		Ba
1,1,2-Trichloroethane	NA	1.20E-01		na	ΑĀ	1.64E+05		na
Toluene	3.37E-04	4.02E+02	8.40E-07	2	3.77E-01	1.88E+05	2.01E-06	2
1,2-Dibromoethane	AN	8.73E-03		na	AN	1.54E+05		na
Tetrachloroethene	ΝA	3.31E+00		na	AN	6.78E+05		na
Chlorobenzene	. NA	6.21E+01		na	Y V	1.38E+05		na
Ethylbenzene	NA	1.06E+03		na	Y.	5.43E+05		na
m&p-Xylene	AA A	7.30E+02		na	NA	6.51E+05		na

Table D-50: Comparison of Air Concentrations With Health-Based Values: Volatile Organic Compounds

TOO Meter location		155mm bro	belling ch	arge M	3AJ (Zone 3).	155mm propelling charge M3A1 (zone 3), M284 cannon			
				DODIG: DB40	DEAD				
Compound (a)	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronlo} / HBSL	> 17	G _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	G _{acute} / ATV	> 12	
Styrene	AN	1.06E+03		na	NA	2.13E+05		na	
1,1,2,2-Tetrachioroethane	ΑN	3.31E-02		na	NA	2.06E+04		na	
o-Xylene	NA	7.30E+02		na	NA	6.51E+05		na	
4-Ethyltoluene	NA	N		na	NA	1.25E+05		na	
1,3,5-Trimethylbenzene	AN	6.21E+00		na	NA	3.68E+05		na	
1,2,4-Trimethylbenzene	NA	6.21E+00		na	NA	1.80E+05		na	
Benzyl Chloride	NA	3.96E-02		na	NA	5.20E+03		na	
m-Dichlorobenzene	NA	3.29E+00		na	NA	3.61E+04		na	
p-Dichlorobenzene	NA	3.06E-01		na	NA	6.61E+05		na	
o-Dichlorobenzene	NA	2.09E+02		na	NA	3.01E+05		na	
1,2,4-Trichlorobenzene	NA	2.08E+02		na	NA	3.71E+04		na	
Hexachlorobutadiene	NA	8.62E-02		na	NA	3.21E+04		na	
Hydrocarbons									
Methane	7.27E-02	N		na	3.25E+02	3.30E+06	9.84E-05	ou	
Ethane	NA	N<		na	NA	NA		na	
Ethylene	NA	N		na	NA	4.60E+05		na	
Propane	NA	NV		na	NA	3.78E+06		na	
Acetylene	NA	N		na	NA	NA		na	
Isobutane	NA	N		na	AA	9.52E+05		na	
n-Butane	NA	N		na	NA	5.71E+06		na	
Propylene	NA	N		na	NA	NA		na	
ootnotes:									

NA = Not applicable

na = Not available because health-based screening value is not available or not applicable because compound was not detected.

NV = No value

C_{chronic} = Chronic time-averaged concentration

HBSL = Chronic health-based screening level

Cacute = Acute concentration

ATV = Acute toxicity value

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Table D-51: Comparison of Air Concentrations With Health-Based Values: Semi-Volatile Organic Compounds 100 meter location

		155mm pr	p Bullleda	narge N DODIC	large M3A1 (zone 3), ĎODIC: D540	155inm propelling charge M3A1 (zone 3), M284 cannon Dobic: D540		in the second se
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	G _{chronic} / HBSL	> 12	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
SVOCS								
n-nitrosodimethylamine	AN	1.37E-04		na	NA	2.50E+03		na
bis(2-chloroethyl)ether	AN	5.82E-03		na	NA	5.85E+04		na
phenol	8.81E-04	2.19E+03	4.03E-07	no	3.94E+00	3.85E+04	1.02E-04	no
2-chlorophenol	ĀN	1.83E+01		na	NA	5.25E+03		na
1,3-dichlorobenzene	AN	3.29E+00		na	NA	3.61E+04		na
1,4-dichlorobenzene	ΑN	3.06E-01		na	NA	6.61E+05		na
1,2-dichlorobenzene	ΑΝ	2.09E+02		na	NA	3.01E+05		na
benzyl alcohol	ΑN	1.10E+03		na	NA	5.53E+04		na
bis(2-chloroisopropyl)ether	ΑN	1.92E-01		na	NA	6.99E+04		na
2-methylphenol	ΑN	1.83E+02		na	AN	AN		na
hexachloroethane	ΑΝ	4.80E-01		na	NA	2.90E+04		na
n-nitroso-di-n-propylamine	ΑN	9.61E-04		na	NA	2.00E+02		na
4-methylphenol	۸A	1.83E+02		na	NA	NA		na
nitrobenzene	AN	2.09E+00		na	NA	1.51E+04		na
Isophorone	NA	7.08E+00		na	ΔN	2.83E+04		na
2-nitrophenol	ΑN	N<		na	AA	NA		na
2,4-dimethylphenol	AN	7.30E+01		na	NA	NA		na
bis(2-chloroethoxy)methane	AN	N\		na	NA	NA		na
2,4-dichlorophenol	AN	1.10E+01		eu	NA	3.00E+04		na
1,2,4-trichlorobenzene	NA	2.08E+02		na	NA	3.71E+04		na
naphthalene	2.98E-04	3.13E+00	9.53E-05	입	1.33E+00	7.86E+04	1.69E-05	ou
4-chloroaniline	NA	1.46E+01		na	NA	3.00E+04		na
hexachlorobutadiene	NA	8.62E-02		na	NA	3.21E+04		na
4-chloro-3-methylphenol	NA	NV		na	AN	2.00E+04		na
2-methylnaphthalene	AN	7.30E+01		na	NA NA	2.00E+04		na
hexachlorocyclopentadlene	NA	7.30E-02		na	NA	2.23E+02		na
2,4,6-trichtorophenol	NA	1.10E+02		na	AN A	NA A		na
2,4,5-trichlorophenol	NA	3.65E+02		na	NA NA	3.00E+04		na
2-chloronaphthalene	NA	2.92E+02		na	NA	6.00E+02		na
2-nitroaniline	NA	2.09E-01		na	A A	AN		na
dimethylphthalate	NA	3.65E+04		na	¥.	1.50E+04		na
2,6-dinitrotoluene	AN	3.65E+00		na	ΑA	6.00E+02		na

Table D-51: Comparison of Air Concentrations With Health-Based Values: Semi-Volatile Organic Compounds

TOU METER TOCATION				Company of the Control of the		of a year with a second street was an		
		155mm pr	ópelling či	narge N DODIC	arge M3A1 (zone 3), DODIC: DS40	155mm propelling charge M3A1 (zone 3), M284 cannon DODIC: DS40		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	G _{chronic} / HBSL	> 12	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Gacute/ ATV	>13
3-nitroaniline	Ϋ́Α	N		na	Ą	9.00E+03		na
2,4-dinitrophenol	NA	7.30E+00		na	NA	7.50E+03		na
dlbenzofuran	A V	1.46E+01		na	NA	NA		na
2,4-dinitrotoluene	AN	7.30E+00		na	NA	6.00E+02		na
4-nitrophenol	NA	2.92E+01		, na	۸A	3.00E+04		na
4-chlorophenyl-phenylether	ΝΑ	N		na	NA	NA		na
diethyiphthalate	NA	2.92E+03		na	NA	1.50E+04		na
4-nitroaniline	NA	NN		na	NA	9.00E+03		na
4,6-dinitro-2-methylphenol	NA	3.65E-01		na	NA	5.00E+02		na
n-nitrosodiphenylamine(1)	NA	1.37E+00		na	NA	NA		na
4-bromophenyl-phenylether	NA	NV		na	NA	AN		na
hexachlorobenzene	NA	4.18E-03		na	NA	7.50E+01		na
pentachlorophenol	NA	5.60E-02		na	NA	1.50E+03		na
dl-n-butylphthalate	5.57E-04	3.65E+02	1.53E-06	no n	2.49E+00	1.50E+04	1.66E-04	no
butylbenzylphthalate	NA	7.30E+02		na	NA	5.00E+05		na
bis(2-ethylhexyl)phthalate	NA	4.80E-01		na	NA	1.00E+04		na
di-n-octylphthalate	NA	7.30E+01		na	NA	1.50E+05		na
Footnotes:								
NA = Not applicable								
na = Not available because health-based screening value is not available or not applicable because compound was not detected.	sed screening value	is not available or no	ot applicable be	cause co	npound was not de	stected.		
NV = No value								
Cohmic = Chronic time-averaged concentration	centration							

Cehronic = Chronic time-averaged concentration HBSL = Chronic health-based screening level

Cacute = Acute concentration

ATV = Acute toxicity value

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Table D-52: Comparison of Air Concentrations With Health-Based Values: PAHs, Dioxins/Furans, Aldehydes, and Acid Gases

100 meter location								
		1.55mm	propelling	charge r DODIC	large M3A1 (zone 3), DODIC: D540	155mm propelling charge M3A1 (zone 3), M284 cannon DODIC: D540		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 12	C _{scute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacuto/ ATV	× 12
PAHS								
acenaphthylene	4.96E-05	NV		na	2.21E-01	2.00E+02	1.11E-03	no
acenaphthene	ΑN	2.19E+02		na	AN	1.25E+03		na
fluorene	2.04E-06	1.46E+02	1.39E-08	no	9.09E-03	7.50E+04	1.21E-07	no
phenanthrene	1.50E-05	N		na	6.71E-02	2.00E+03	3.35E-05	no
anthracene	4.26E-06	1.10E+03	3.89E-09	ou .	1.90E-02	6.00E+03	3.17E-06	uo
fluoranthene	1.47E-05	1.46E+02	1.01E-07	no	6.57E-02	3.00E+01	2.19E-03	no
pyrene	2.93E-05	1.10E+02	2.67E-07	no	1.31E-01	1.50E+04	8.72E-06	no
benzo(a)anthracene	1.12E-06	2.17E-02	5.15E-05	no	1.16E-02	6.00E+02	1.94E-05	no
chrysene	1.12E-06	2.17E+00	5.15E-07	no	1.16E-02	2.00E+02	5.82E-05	no
benzo(b)fluoranthene	2.92E-06	2.17E-02	1.34E-04	ou	7.60E-03	AN		na
benzo(k)fluoranthene	1.93E-06	2.17E-01	8.88E-06	110	5.02E-03	۸N		na
benzo(a)pyrene	4.43E-06	2.17E-03	2.04E-03	uo	4.61E-02	7.50E+03	6.15E-06	no
indeno(1,2,3-cd)pyrene	6.10E-06	2.17E-02	2.81E-04	uou	1.59E-02	NA		na
dibenz(a,h)anthracene	2.09E-07	2.17E-03	9.65E-05	On	2.18E-03	3.00E+04	7.27E-08	no
benzo(g,h,l)perylene	2.52E-05	NV		na	1.13E-01	3.00E+04	3.75E-06	no
Dioxins / Furans								
2378-Tetrachlorodibenzo-p-dioxin	¥	4.48E-08		na	NA	3.50E+00		na
12378-Pentachlorodibenzo-p-dioxin	NA	N		na	NA	2.50E+00		na
123478-Hexachlorodibenzo-p-dioxin	NA	NV		na	NA	NA		na
123678-Hexachlorodibenzo-p-dioxin	7.13E-11	NV		na	3.18E-07	1.50E+01	2.12E-08	no
123789-Hexachlorodibenzo-p-dioxin	3.47E-11	1.48E-06	2.35E-05	ou	9.05E-08	NA		na
1234678-Heptachlorodibenzo-p-dloxin	8.47E-10	≥		na	9.45E-07	۸A		na
Octachlorodibenzo-p-dloxin	4.08E-09	Ž		na	4.55E-06	ΑĀ		na
2378-Tetrachlorodibenzo-p-furan	NA NA	N		na	ΔN	2.00E+00		na
12378-Pentachlorodibenzo-p-furan	NA	2		na	NA	NA		na
23478-Pentachlorodibenzo-o-furan	AN	N		па	NA	7.50E-02		na
123478-Hexachlorodibenzo-p-furan	¥ V	2		na	۸A	7.50E+00		na
123789-Hexachlorodlbenzo-p-furan	NA	N		na	NA	NA		na
234678-Hexachlorodibenzo-p-furan	NA NA	Ž		na	AN	1.50E+00		na
1234678-Heptachlorodibenzo-p-furan	5.98E-11	≥		Б	6.68E-08	NA		na
1234789-Heptachlorodibenzo-p-furan	NA .	NV		na	NA	NA		na
OCDF	1.26E-10	N N		na	1.40E-07	۸A		na
Aldehydes								
Formaldehyde	NA NA	1.48E-01		na	NA	1.23E+03		na

Table D-52: Comparison of Air Concentrations With Health-Based Values: PAHs, Dioxins/Furans, Aldehydes, and Acid Gases

		155mm	bropelling	Sharge A	large M3A1 (zone 3), DODIC: D540	155mm propelling charge M3A1 (zone 3), M284 cannon DODIC: D540		-
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	G _{chronic} / HBSL	× 12	G _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	>12
Acetaldehyde	NA	8.73E-01		na	Ϋ́	1.80E+04		ē
Acetone	NA	3.65E+02		na	ΑN	2.37E+06		eu
Acrolein	NA	2.09E-02		na	ΑN	2.30E+02		na
Proprionaldehyde	NA	NV		na	ΑN	7.50E+04		na
Crotonaldehyde	NA	3.54E-03		na	ΑN	5.72E+03		na
Butyraldehyde	NA	N<		, na	ΑN	7.38E+04		na
Benzaldehyde	NA	3.65E+02		na	ΑN	1.50E+04		na
Isovaleraldehyde	A A	N		na	AN	NA		Ba
Valeraldehyde	NA	N		na	NA	¥		na
o,m,p-Tolualdehyde	NA	۸N		na	AN	AN		2
Hexaldehyde	AN	2		na	ΝΑ	AN		7
2,5-Dimethylbenzaldehyde	NA	2		na	AN AN	AN		0
Acid Gases								5
Hydrogen fluoride	NA	N<		na	AN	1,60E+03		80
Hydrogen chloride	NA	2.08E+01		na	ΑN	4.50E+03		ec
Hydrogen bromide	NA	N		na	ΑN	9.93E+03		g
Nitric Acid	1.90E-03	N.		na	2.12E+00	5.16E+03	4.10F-04	
Phosphoric acid	NA	1.04E+01		na	AN	3.00E+03		9
Sulfuric Acid	2.80E-02	N		na	3.12E+01	2.00E+03	1.56E-02	2
Footnote:								

NA = Not applicable because compound was not detected. na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value

Cehronic = Chronic time-averaged concentration; HBSL = Chronic health-based screening level Cacule = Acute concentration; ATV = Acute toxicity value

Table D-53: Comparison of Air Concentrations With Health-Based Values: Cyanides and Energetics

100 meter location		155mm	propelling	sharge 1	155mm propelling charge M3A1 (zone 3), M284 cannon DODIC: D540	M284 cannon		
Compound	С _{сhronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronte} / HBSL	> 12	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	C _{ecute} / ATV	> 12
Particulate Cyanide and Hydrogen Cvanide (CN)								
Particulate Cvanide	NA	7.30E+01		na	NA	5.00E+03		na
Hydrogen Cyanide	8.53E-02	3.13E+00	2.73E-02	no	3.81E+02	5.17E+03	7.37E-02	ou
Energetics								
Nitrobenzene	AN	2.09E+00	•	na	ΑN	1.51E+04		na
2-Nitrotoluene	AN	3.65E+01		na	VΝ	NA		na
3-Nitrotoluene	NA	3.65E+01		na	VΑ	NA		na
4-Nitrotoluene	ΑΝ	3.65E+01		na	ΑN	3.37E+04		na
Nitroglycerine	AN	4.80E-01		na	AN	NA		na
1,3-Dinitrobenzene	AN	3.65E-01		na	NA	3.00E+03		na
2,6-Dinitrotoluene	NA	3.65E+00		na	NA	6.00E+02		na
2,4-Dinitrotoluene	ΑN	7.30E+00		na	NA	6.00E+02		na
1,3,5-Trinitrobenzene	A A	1.10E+02		na	NA	3.00E+04		na
2,4,6-Trinitrotoluene	NA	2.24E-01		na	NA	2.50E+04		na
RDX	NA	6.11E-02		na	NA	NA		na
4-Amino-2,6-Dinitrotoluene	AN	N			NA	NA		
2-Amino-4,6-Dinitrotoluene	NA NA	N			NA	1.50E+04		•
Tetryl	ΑN	3.65E+01		na	NA	NA		na
HMX	AN	1.83E+02		na	NA	NA		na
Pentaerythritoltetranitrate	NA	N/		na	NA	5.00E+01		na
Dibutyl phthalate	NA	3.65E+02		na	NA	1.50E+04		na
Dioctyl phthalate	AN	4.80E-01		na	NA	1.00E+04		na
Diphenylamine	NA	9.13E+01		na	NA	3.00E+04		na

NA = Not applicable because compound was not detected.

na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value

Cehronic = Chronic time-averaged concentration; HBSL = Chronic health-based screening level

Cacute = Acute concentration; ATV = Acute toxicity value

1/16/01

Table D-54: Comparison of Air Concentrations With Health-Based Values: Total Petroleum Hydrocarbons 100 meter location

	155mm p	ropelling charge l DODIC	155mm propelling charge M3A1 (zone 3), M284 cannon DÓDIC: D540	84 cannon
Compound (a)	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)
	Aliphatic: C<=8	Allphatic:C>8	Aromatic: C<=8	Aromatic: C>8
Benzene	NA	NA	5.18E-03	NA
Toluene	NA AN	NA	3.37E-04	AN
naphthalene	NA	- NA	AN	2.98E-04
acenaphthylene	ΑN	NA	NA	4.96E-05
acenaphthene	ΑN	NA	AN	
fluorene	AN	NA	N A	2.04E-06
phenanthrene	AN	NA	AN	1.50E-05
anthracene	AN	NA	NA	4,26E-06
Total (µg/m³)	0.00E+00	0.00E+00	5.52E-03	3.69E-04
Derived Health-Based Screening Level	1.92E+04	1.04E+03	4.17E+02	2.09E+02
C _{chronic} /HBSL	0.00E+00	0.00E+00	1.32E-05	1.77E-06
>12	no	no	ou	ou
ootnotes:				
1? = Is the ratio greater than one?				

NA = Not Applicable because compound was not detected

 $C_{chronic}$ = chronic averaged air Concentration (not adjusted for cancer averaging time of 70 years) HBSL = Health-Based Screening Level

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RISK EVALUATION DATA FOR CHARGE M3A1, FIRED FROM THE M284 CANNON, ZONE 3, 200 METERS DOWNWIND

Table D-55: Comparison of Air Concentrations With Health-Based Values: Gases, Particulates and Metals

200 meter location		155mm	o ropelling c	Harge N	arge M3A1 (zone 3), Dobic: D540	155mm propelling charge M3A1 (zone 3), M284 cannon Dopic: Dag		
Compound	Cehronic (µg/m³)	Health-Based Screening Level (µg/m³)	Cehronic/ HBSL	>12	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
Gases								
NF.	9.05E-01	1.04E+02	8.68E-03	no	1.01E+03	1.75E+04	5.77E-02	20
Carbon Dioxide (CO ₂)	1.00E+01	Š		na	4.47E+04	5.40E+07	8.28E-04	uou
Carbon Monovida (CO)	2.71E+01	1.57E+02	1.73E-01	on O	3.03E+04	2.30E+05	1.32E-01	no
Nitroden Oxides (as NO)	4.83E-01	1.00E+02	4.83E-03	no	2.16E+03	2.70E+05	7.99E-03	no
Methane (CH ₄)	AN	N		na	NA	3.30E+06		na
Sulfur Dioxide (SO ₂)	AN	8.00E+01		na	NA	7.89E+02		na
Combined Particulate								
TSP	9.58E-01	5.00E+01	1.92E-02	no	1.07E+03	AA		na
PM.	8.49E-01	5.00E+01	1.70E-02	ou	9.47E+02	NA		na
PM.	4.75E-01	1.50E+01	3.17E-02	OU	5.31E+02	NA		na
Metals								
Antimony	AN	1.46E+00		na	NA	1.50E+03		na
Arsenic	1.40E-05	4.47E-04	3.14E-02	ou	1.46E-01	3.00E+01	4.87E-03	no
Barlum	7.58E-04	5.21E-01	1.45E-03	ou	3.38E+00	1.50E+03	2.26E-03	90
Berdlium	AN	8.00E-04	,	na	NA	5.00E+00		na
Cadmium	Ā	1.07E-03		na	NA	3,00E+01		na
Chromium	2.97E-05	1.53E-04	1.94E-01	ou	3.09E-01	1.50E+03	2.06E-04	no
Cobalt	1.05E-05	2.20E+02	4.77E-08	9	4.69E-02	6.00E+01	7.81E-04	2
Copper	3.72E-02	1.46E+02	2.55E-04	잍	1.66E+02	3,00E+03	5.53E-0Z	no
Lead	2.67E-03	1.50E+00	1.78E-03	ou	1.19E+01	1.50E+02	7.95E-02	ou
Manganese	2.29E-04	5.11E-02	4.49E-03	no	1.02E+00	3.00E+03	3.42E-04	OU.
Nickel	1.07E-10	7.30E+01	1.47E-12	2	4.78E-01	3.00E+03	1.59E-04	ဥ
Selenium	AN	1.83E+01		na	NA	6.00E+02		na
Silver	AN	1.83E+01		na	NA	3.00E+02		na
Thaillum	NA	2.56E-01		na	AN	3.00E+02		na
Zinc	7.02E-09	1.10E+03	6.41E-12	2	3.13E+01	3.00E+04	1.04E-03	2
Colonia.								

NA = Not applicable because compound was not detected. na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value

M3rlsk1.xls

 C_{chronic} = Chronic time-averaged concentration; HBSL = Chronic health-based screening level C_{scute} = Acute concentration; ATV = Acute toxicity value

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Table D-56: Comparison of Air Concentrations With Health-Based Values: Volatile Organic Compounds 200 meter location

200 meter location		155mm pro	pelling ch	arge N	arge M3A1 (2one 3),	155mm propelling charge M3A1 (2one 3), M284 cannon		
Compound (a)	Gehronic (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chrontc} /	> 1?	Cacute (µg/m³)	Acute Toxicity Value (µg/m³)	Cacuto/ ATV	> 12
VOCs								
Dichlorodifluoromethane	A	2.09E+02		na	NA	1.48E+07		E
Methyl Chloride	NA	1.07E+00		na	AN	2.06E+05		na
Dichlorotetrafluoroethane	AN	N N		na	NA	AN		na
Vinyl Chloride	NA	2.20E-02		na	ΑΝ	1.28E+04		na
1,3-Butadlene	AN	3.74E-03		na	NA	2.20E+04		na
Methyl Bromide	NA	5.21E+00		na	NA	5.82E+04		na
Ethyi Chloride	NA	2.32E+00		na	NA	7.92E+06		na
Trichlorofluoromethane	NA	7.30E+02		na	NA	2.81E+06		na
1,1-Dichloroethene	4.28E-04	5.21E+02	8.22E-07	no	4.78E-01	7.92E+04	6.04E-06	01
Dichloromethane	\sim	4.09E+00	3.02E-03	no	3.22E+01	6.96E+05	4.62E-05	no
3-Chloropropene	NA	1.04E+00		na	AN	9.39E+03		na
1,1,2-Trichloro-1,2,2-trifluoroethane	NA	3.13E+04		na	NA	9.58E+06		па
1,1-Dichloroethane	NA	5.21E+02		na	NA	1.21E+06		na
cls-1,2-Dichloroethene	NA	3.65E+01		na	NA	7.92E+05		na
Trichloromethane	AA	8.35E-02		na	NA	9.76E+03		na
1,2-Dichloroethane	NA	7.39E-02		na	NA	8.08E+03		na
1,1,1-Trichloroethane	2.85E-03	1.04E+03	2.73E-06	no	3.18E+00	1.94E+06	1.64E-06	ou
Benzene	اب	2.49E-01	1.65E-02	92	1.07E+01	1.56E+05	6.86E-05	ou
Carbon Tetrachloride	NA	1.28E-01		na	NA	1.28E+05		na L
1,2-Dichloropropane	NA	9.89E-02		na	NA	5.08E+05		na
Trichloroethene	NA	1.12E+00		na	NA	5.38E+05		na
cis-1,3-Dichloropropene	Ą	5.17E-02		na	NA	1.14E+04		na
trans-1,3-Dichloropropene	NA	5.17E-02		na	NA	NA		na
1,1,2-Trichloroethane		1.20E-01		na	NA	1.64E+05		na
Toluene	6.25E-04	4.02E+02	1.56E-06	no	6.97E-01	1.88E+05	3.72E-06	92
1,2-Dibromoethane	AA	8.73E-03		na	NA	1.54E+05		na
Tetrachloroethene	NA NA	3.31E+00		na	NA	6.78E+05		na
Chlorobenzene	NA	6.21E+01		na	NA	1.38E+05		na
Ethylbenzene	AN	1.06E+03		na	AN	5.43E+05		na
m&p-Xylene	NA	7.30E+02		na	NA	6.51E+05		. na

Table D-56: Comparison of Air Concentrations With Health-Based Values: Volatile Organic Compounds 200 meter location

		155mm pro	pelling of	arge M3A1 (z	3A1 (zone 3),	155mm propelling charge M3A1 (zone 3), M284 cannon		
			100 K 3 A A A A A A A A A A A A A A A A A A			A CONTRACTOR OF THE CONTRACTOR		
		Health-Based						
Compound (a)	Cchronic (µg/m³)	Screening Level	Cohronic/	> 12	Cacute (µg/m³)	Acute Toxicity	Cacuta/ ATV	> 12
		(hg/m³)	HBSL			Value (µg/m²)		:
Styrene	NA	1.06E+03		na	Ϋ́	2.13E+05		na
1,1,2,2-Tetrachioroethane	NA	3.31E-02		na	AN	2.06E+04		Da
o-Xylene	۸A	7.30E+02		na	NA	6.51E+05		na
4-Ethyltoluene	AA	N		na	AN	1.25E+05		na
1,3,5-Trimethylbenzene	NA	6.21E+00	-	na	NA	3.68E+05		na
1,2,4-Trimethylbenzene	NA	6.21E+00		na	NA	1.80E+05		na
Benzyl Chloride	NA	3.96E-02		na	NA	5,20E+03		na
m-Dichlorobenzene	NA	3.29E+00		na	NA	3.61E+04		Ba
p-Dichlorobenzene	NA	3.06E-01		na	A A	6.61E+05		na
o-Dichlorobenzene	AA	2.09E+02		na	ΝΑ	3.01E+05		na
1,2,4-Trichlorobenzene	AA	2.08E+02		na	NA	3.71E+04		na
Hexachlorobutadiene	ΝΑ	8.62E-02		na	A A	3.21E+04		na
Hydrocarbons								
Methane	1.35E-01	N		na	6.01E+02	3.30E+06	1.82E-04	00
Ethane	NA	<u>N</u>		na	AN	Y.		na
Ethylene	NA	N		na	NA	4.60E+05		na
Propane	NA	№		na	NA	3.78E+06		na
Acetylene	NA	N		na	NA	AN		na
Isobutane	NA	N/		na	ΑN	9.52E+05		eu
n-Butane	NA	N		na	ΑN	5.71E+06		2
Propylene	NA	2		na	ΑN	AN AN		20
- cotocioci								5

Footnotes: NA = Not applicable

na = Not available because health-based screening value is not available or not applicable because compound was not detected.

VV = No value

Schronic = Chronic time-averaged concentration

HBSL = Chronic health-based screening level

Sacute = Acute concentration

ATV = Acute toxicity value

Table D-57: Comparison of Air Concentrations With Health-Based Values: Semi-Volatile Organic Compounds

> 1? па na na na na 2 па na Б na 2 na na na na na пa na na na na E na 2 na na na пa Cacute/ ATV 3.14E-05 1.89E-04 155mm propelling charge M3A1 (zone 3), M284 cannon **Acute Toxicity** Value (µg/m³) 3.71E+04 7.86E+04 3.00E+04 3.21E+04 2.00E+04 5.53E+04 6.99E+04 2.90E+04 2.00E+02 3.00E+04 6.00E+02 1.50E+04 2.00E+04 2,23E+02 6.00E+02 3.85E+04 3.61E+04 6.61E+05 3.01E+05 1.51E+04 2.83E+04 3.00E+04 5.25E+03 ¥ Ž Cacute (µg/m³) NA 2.47E+00 **44444 4444 4444** Y Y Y Z Z Z ₹ bobic: 0540 > 12 na 2 na na 5 E na na B na na na 2 2 2 2 B na na na Па пa na na g na a 2 шa 1.77E-04 C_{chronle}/HBSL 7.45E-07 Screening Level Health-Based 3.65E+04 3.65E+00 3.13E+00 1.46E+01 8.62E-02 7.30E-02 1.10E+02 1.83E+02 4.80E-01 1.83E+02 2.09E+00 7.08E+00 3.65E+02 2.92E+02 2.09E+02 1.10E+03 7.30E+01 1.10E+01 2.08E+02 7.30E+01 2.09E-01 2.19E+03 3.29E+00 9.61E-04 1.83E+01 1.92E-01 1.37E-04 3.06E-01 (hg/m³) ⋛ ⋛ Cchronic (µg/m³) 5.52E-04 **AAAAA** ¥ ¥ ₹ **\$ \$ \$** N ₹ Ž ¥ Ž ¥ ¥ ¥ ₹ ž 200 meter location bis(2-chloroethoxy)methane hexachlorocyclopentadiene n-nitroso-di-n-propylamine bis(2-chloroisopropyl)ether 4-chloro-3-methylphenol 1,2,4-trichlorobenzene n-nitrosodimethylamine 2-methylnaphthalene 2,4,6-trichlorophenol 2-chloronaphthalene hexachlorobutadiene 2,4,5-trichlorophenol bis(2-chloroethyl)ether 1,3-dichlorobenzene 1,4-dichlorobenzene 1,2-dichlorobenzene dimethylphthalate 2,6-dinitrotoluene 2,4-dimethylphenol 2,4-dichlorophenol hexachloroethane 2-methylphenol 4-chloroaniline 4-methylphenol 2-nitroaniline 2-chlorophenol benzyl alcohol naphthalene nitrobenzene 2-nitrophenol Compound isophorone phenol

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Table D-57: Comparison of Air Concentrations With Health-Based Values: Semi-Volatile Organic Compounds 200 meter location

			bodbic: 5540	bobic	စ်စ်biင်: စ်နှစ	1000		
Compound	С _{сhronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronlc} / HBSL	> 1?	C _{scute} (µg/m³)	Acute Toxicity Value (µg/m³)	C _{acute} / ATV	× .
3-nitroaniline	NA	N/		na	AN	9.00E+03		na
2,4-dinitrophenol	NA	7.30E+00		na	NA	7.50E+03		na
dlbenzofuran	NA	1.46E+01		na	ΝΑ	AN		na
2,4-dinitrotoluene	NA	7.30E+00		na	AN	6.00E+02		na
4-nitrophenol	NA	2.92E+01		, na	NA	3.00E+04		na
4-chlorophenyl-phenylether	NA	NV		na	NA	AN		na
diethylphthalate	NA	2.92E+03		na	NA	1.50E+04		na
4-nitroaniline	AN	N/		na	AN	9.00E+03		пa
4,6-dinitro-2-methylphenol	NA	3.65E-01		na	NA	5.00E+02		na
n-nitrosodiphenylamine(1)	NA	1.37E+00		na	NA	NA		na
4-bromophenyl-phenylether	NA	NN		na	NA.	NA		na
hexachlorobenzene	NA	4.18E-03		na	NA	7.50E+01		na
pentachlorophenol	AN	5.60E-02		na	NA	1.50E+03		na
di-n-butyiphthalate	1.03E-03	3.65E+02	2.83E-06	OU OL	4.61E+00	1.50E+04	3.07E-04	S C
butylbenzylphthalate	NA	7.30E+02		na	NA	5.00E+05		na
bis(2-ethylhexyl)phthalate	NA	4.80E-01		na	NA	1.00E+04		na
di-n-octyiphthalate	NA	7.30E+01		na	AN	1.50E+05		na

NA = Not applicable

na = Not available because health-based screening value is not available or not applicable because compound was not detected.

NV = No value

Cehronic = Chronic time-averaged concentration

HBSL = Chronic health-based screening level

Cacute = Acute concentration

ATV = Acute toxicity value

Table D-58: Comparison of Air Concentrations With Health-Based Values: PAHs, Dioxins/Furans, Aldehydes, and Acid Gases

ZOO HIGHEI TOCALION		155mm	nranellina	harde	13A1 (Zone 3).	155mm probelling charge M3A1 (zone 3), M284 cannon		
	The state of the s			מסמונ	DÓDIC: DS40			
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 12	G _{ecute} (µg/m³)	Acute Toxicity Value (μg/m³)	Cacute/ ATV	> 1?
PAHs								
acenaphthylene	9.18E-05	N		na	4.10E-01	2.00E+02	2.05E-03	no
acenaphthene	NA	2.19E+02		na	NA	1.25E+03		na
fluorene	3.77E-06	1.46E+02	2.58E-08	no	1.68E-02	7.50E+04	2.24E-07	no
phenanthrene	2.78E-05	Ž		na	1.24E-01	2.00E+03	6.21E-05	no
anthracene	7.88E-06	1.10E+03	7.20E-09	, no	3.52E-02	6.00E+03	5.87E-06	no
fluoranthene	2.72E-05	1.46E+02	1.86E-07	no	1.22E-01	3.00E+01	4.05E-03	OU
pyrene	5.42E-05	1.10E+02	4.95E-07	no	2.42E-01	1.50E+04	1.61E-05	uo
benzo(a)anthracene	2.07E-06	2.17E-02	9.54E-05	no	2.16E-02	6.00E+02	3.60E-05	no
eueskiyo	2.07E-06	2.17E+00	9.54E-07	no	2.16E-02	2.00E+02	1.08E-04	no
benzo(b)fluoranthene	5.40E-06	2.17E-02	2,49E-04	no	1.41E-02	AN		na
benzo(k)fluoranthene	3.57E-06	2.17E-01	1.64E-05	no	9.29E-03	AN		na
benzo(a)pyrene	8.20E-06	2.17E-03	3.78E-03	no	8.54E-02	7.50E+03	1.14E-05	ou
indeno(1,2,3-cd)pyrene	1.13E-05	2.17E-02	5.21E-04	2	2.94E-02	Ä		na
dibenz(a,h)anthracene	3.87E-07	2.17E-03	1.79E-04	no	4.04E-03	3.00E+04	1.35E-07	ou
benzo(g,h,i)perylene	4.67E-05	N		na	2.08E-01	3.00E+04	6.95E-08	ou ·
Dioxins / Furans								
2378-Tetrachlorodibenzo-p-dloxin	NA V	4.48E-08		na	AA	3.50E+00		na
12378-Pentachlorodibenzo-p-dioxin	NA	N		na	Ā	2.50E+00		na
123478-Hexachlorodibenzo-p-dloxin	NA	N		na	NA	AN		na
123678-Hexachlorodibenzo-p-dioxin	1.32E-10	N		na	5.90E-07	1.50E+01	3.93E-08	on .
123789-Hexachlorodibenzo-p-dloxin	6.43E-11	1.48E-06	4.35E-05	92	1.68E-07	NA NA		na
1234678-Heptachlorodlbenzo-p-dloxin	1.57E-09	2		na	1.75E-06	AN		na
Octachlorodibenzo-p-dioxin	7.55E-09	Š		na	8.43E-06	A A		na
2378-Tetrachlorodibenzo-p-furan	NA A	2		na	NA	2.00E+00		па
12378-Pentachlorodibenzo-p-furan	NA	N		na	NA	NA		na
23478-Pentachlorodibenzo-o-furan	NA	N		na	NA	7.50E-02		na
123478-Hexachlorodibenzo-p-furan	NA	N		na	NA A	7.50E+00		na
123789-Hexachlorodibenzo-p-furan	NA	N		na	NA	N.		na
234678-Hexachlorodibenzo-p-furan	NA	N/		na	NA	1.50E+00		na
1234678-Heptachlorodibenzo-p-furan	1.11E-10	NV		na	1.24E-07	NA		na
1234789-Heptachlorodibenzo-p-furan	, NA	NV		na	NA	NA		na
OCDF	2.33E-10	NV		na	2.60E-07	AN		na
Aldehydes								
Formaldehyde	ΑN	1.48E-01		па	NA V	1.23E+03		na

Table D-58: Comparison of Air Concentrations With Health-Based Values: PAHs, Dioxins/Furans, Aldehydes, and Acid Gases 200 meter location

		155mm	propelling	sharge N DODIC	large M3A1 (zone 3), DODIC: D540	155mm propelling charge M3A1 (zone 3); M284 cannon DODIC: D540		,
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	С _{асиte} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
Acetaldehyde	NA	8.73E-01		na	NA	1.80E+04		na
Acetone	NA	3.65E+02		na	NA	2.37E+06		na
Acrolein	NA	2.09E-02		na	NA	2.30E+02		na
Proprionaldehyde	NA	· AN		na	NA	7.50E+04		na
Crotonaldehyde	NA	3.54E-03		na	NA ·	5.72E+03		na
Butyraldehyde	NA	N/		, na	NA	7.38E+04		na
Benzaldehyde	NA	3.65E+02		na	NA	1.50E+04		na
Isovaleraldehyde	NA	N\		na	NA	NA		na
Valeraldehyde	NA	N		na	NA	AN		na
o,m,p-Tolualdehyde	NA	N\		na	AN	NA		na
Hexaldehyde	AN	N\		ua	AN	NA		na
2,5-Dimethylbenzaldehyde	NA	N		na	AN	NA		na
Acid Gases		•						
Hydrogen fluoride	AN	NV		eu	AN	1.60E+03		na
Hydrogen chloride	NA	2.08E+01		na	NA	4.50E+03		na
Hydrogen bromide	NA	N		na	NA	9.93E+03		na
Nitric Acid	3.51E-03	N/		na	3.92E+00	5.16E+03	7.60E-04	no
Phosphoric acid	NA	1.04E+01		na	NA	3.00E+03		na
Sulfuric Acid	5.18E-02	NV		na	5.78E+01	2.00E+03	2.89E-02	no

NA = Not applicable because compound was not detected.

na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value

 $C_{chronic} = Chronic time-averaged concentration; HBSL = Chronic health-based screening level <math>C_{acute} = Acute$ concentration; ATV = Acute toxicity value

Table D-59: Comparison of Air Concentrations With Health-Based Values: Cyanides and Energetics

200 meter location								
		155mm	propelling	sharge N DODIC	arge M3A1 (zone 3), DODIC: D540	155mm propeiling charge M3A1 (zone 3), M284 cannon DODIC:: D540		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{scute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
Particulate Cyanide and Hydrogen Cyanide (CN)								1
Particulate Cyanide	NA	7.30E+01		na	NA	5.00E+03		na
Hydrogen Cyanide	1.58E-01	3.13E+00	5.05E-02	ou	7.06E+02	5.17E+03	1.37E-01	no
Energetics								
Nitrobenzene	NA	2.09E+00	,	na	AN	1.51E+04		na
2-Nitrotoluene	NA	3.65E+01		na	NA	NA		na
3-Nitrotoluene	NA	3.65E+01		na	NA	NA		na
4-Nitrotoluene	NA	3.65E+01		na	NA	3.37E+04		na
Nitroglycerine	NA	4.80E-01		na	NA	AN		na
1,3-Dinitrobenzene	NA	3.65E-01		na	NA	3.00E+03		na
2,6-Dinitrotoluene	NA	3.65E+00		na	NA	6.00E+02		na
2,4-Dinitrotoluene	NA	7.30E+00		na	NA	6,00E+02		na
1,3,5-Trinitrobenzene	NA	1.10E+02		na	NA	3.00E+04		na
2,4,6-Trinitrotoluene	NA	2.24E-01		na	NA	2.50E+04		na
RDX	NA	6.11E-02		na	NA	NA		na
4-Amino-2,6-Dinitrotoluene	NA	N			NA	NA		
2-Amino-4,6-Dinitrotoluene	NA	N.			NA	1.50E+04		
Tetryl	NA	3.65E+01		na	NA	NA		na
HMX	NA	1.83E+02		na	NA	AN		na
Pentaerythritoltetranitrate	NA	N N		na	NA	5.00E+01		na
Dibutyl phthalate	NA	3.65E+02		na	NA NA	1.50E+04		na
Dioctyl phthalate	ΝΑ	4.80E-01		na	NA NA	1.00E+04		na
Diphenylamine	NA	9.13E+01		na	NA	3.00E+04		na
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NA = Not applicable because compound was not detected.

na = Not available because health-based screening value is not available or not applicable if compound was not detected.

NV = No value

C_{chronic} = Chronic time-averaged concentration; HBSL = Chronic health-based screening level C_{scute} = Acute concentration; ATV = Acute toxicity value

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Table D-60: Comparison of Air Concentrations With Health-Based Values: Total Petroleum Hydrocarbons 200 meter location

	185ოm թ	ropelling charge i bobic	185mm propelling charge M3A1 (2one 3), M284 cannon BODIC: B540	34 cannon
Compound (a)	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)	С _{сhronic} (µg/m³)
	Allphatic:C<=8	Allphatic:C>8	Aromatic: C<=8	Aromatic:C>8
Benzene	NA	NA	9.59E-03	NA
Toluene	NA	ΑN	6.25E-04	AN
naphthalene	NA	· NA	NA	5.52E-04
acenaphthylene	NA	NA	NA	9.18E-05
acenaphthene	NA	NA	NA	
fluorene	AN	ΑΝ	NA	3.77E-06
phenanthrene	AN	AN	NA	2.78E-05
anthracene	NA	NA	NA	7.88E-06
Total (µg/m³)	0.00E+00	0.00E+00	1.02E-02	6.84E-04
Derived Health-Based Screening Level	1.92E+04	1.04E+03	4.17E+02	2.09E+02
C _{chronic} /HBSL	0.00E+00	0.00E+00	2.45E-05	3.28E-06
>1?	no	ou	no	no

>1? = Is the ratio greater than one?

NA = Not Applicable because compound was not detected

C_{chronic} = chronic averaged air Concentration (not adjusted for cancer averaging time of 70 years)

HBSL = Health-Based Screening Level

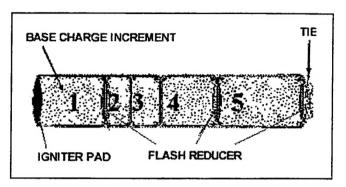
APPENDIX E

FACT SHEET SUBMITTED TO THE U.S. ARMY ENVIRONMENTAL CENTER

U.S. Army Environmental Center Training Munitions Fact Sheet

155-mm Propelling Charge (M3 Series)Department of Defense Identification Code: D540

Breathing air emissions from the 155-mm propelling charge will not impact the health of residents who live as close as 200 meters (656 feet) from the firing location.



To be fully prepared to protect our country, U.S. soldiers must train with many different weapons and munitions, including the 155-mm propelling charge. This training is important because it helps prepare our soldiers for a variety of combat situations. While the Army recognizes the value of such comprehensive training on our installations, we also work hard to ensure the safety and health of surrounding communities.

WILL BREATHING AIR EMISSIONS FROM THE 155-MM PROPELLING CHARGE AFFECT MY HEALTH?

To answer this question, the U.S. Army tested the air emissions that are released when the 155-mm propelling charge is used. The information gathered during these tests was then analyzed to determine if there would be a potential for health effects from inhalation to residents who live near training areas. Study results, generated using conservative methods, showed that offsite residents breathing air as close as 200 meters (656 feet or about the length of two football fields) from the firing location are safe from these emissions. If offsite residents are located less than 200 meters from the firing locations, a more site-specific evaluation would be necessary. It should be noted that at most locations, training areas are at least 1,000 meters (over half a mile) away from populated areas and the distance to firing locations may be even farther.

How Was The Study Conducted?

To gather data for this study, the M3 series charges were used with two different kinds of howitzer cannons in a test chamber. The air in the chamber was then tested to identify the types and amounts of substances released. About 300 different substances were looked for during this part of the study.

This information was then used in an U.S. Environmental Protection Agency (USEPA) approved air model (a computer program that allows estimation of air concentrations) to determine the amount of each substance to which someone living near a training site might be exposed. Downwind concentrations were estimated based on a typical use scenario for the 155-mm propelling charge during training exercises. Since this study did not look at any one specific training area, the assumptions used in the model would, in most cases, predict higher downwind air concentrations than those expected at an actual training site.

These estimated air concentrations were then compared to screening levels established by the USEPA and other federal agencies. If the air concentrations are less than these screening levels, they are considered safe for the general population, including sensitive people such as the sick, elderly, and children.

WHAT ARE THE STUDY LIMITATIONS?

Many steps were taken to ensure that the results of this study are protective of residents who live near training facilities. However, as with any study, this study has limitations. For example, the study does not consider exposure to other types of munitions that could also be used during the same training event. Due to these limitations, conservative model conditions were used to ensure the protection of public health from breathing air emissions from the 155-mm propelling charge.

WHAT EXACTLY IS THE 155-MM PROPELLING CHARGE?

Propelling charges are a type of explosive that provides the thrust needed to send projectiles into the air. The 155-mm propelling charge is used for firing projectiles from 155-mm howitzers (a kind of cannon). This charge can be classified into two types: M3A1 and M3, or simply, the M3 series. They are also commonly called "green bags". The 155-mm propelling charge consists of five bags of different charge. Each bag is also called an increment. The bags are fastened together with cloth straps sewn to the base of each increment and tied on the top of the fifth increment. Up to five charges can be loaded into the howitzer before a projectile can be fired. The actual number of charges fired with the projectile will depend on the distance to the target and other tactical factors. The M3 and M3A1 charges have a slightly different composition. Charge M3A1 has flash reducer pads that contain either potassium nitrate or potassium sulfate. Both types have an igniter charge which is made up of mostly nitrocellulose or black powder. Nitrocellulose and black powder are commonly used in consumer fireworks.

WHERE CAN I GET MORE INFORMATION?

For more information on the 155-mm propelling charge or other military munitions, please call the Army Environmental Hotline at 1-800-USA-3845, visit our Web site at www.aec.army.mil, or e-mail t2hotline@aec.apgea.army.mil.

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